Southern California's Computer Magazine Feb. 21, 1994 • #120 FREE

MicroTimes™

From Mac To (General) Magic

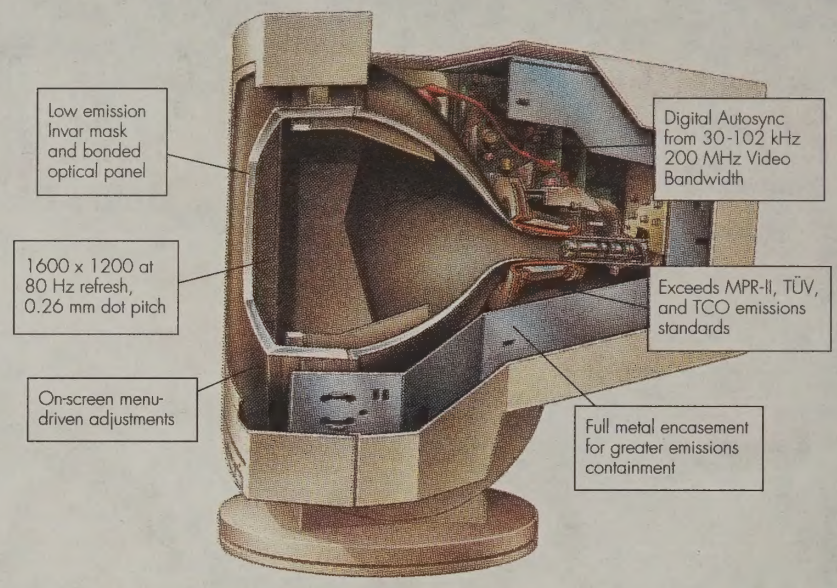
Bill Atkins: "I think the opportunity is just like with the Macintosh. With or without General Magic, there will be little pocketable electronic communicators that merge telephony and messaging. How is that going to feel?

Mac Pioneers Develop Communications For Humans

Multi Media & beyond

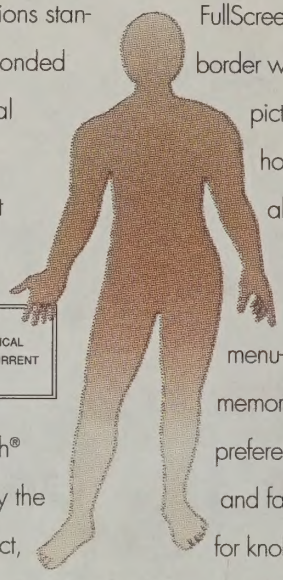
Sanctuary Woods Games, CD32—ommodore's New Game Box

OUR MONITORS LAST SO LONG, WE'VE HAD TO EXTEND THE LIVES OF OUR CUSTOMERS.


Low emission Invar mask and bonded optical panel
1600 x 1200 at 80 Hz refresh, 0.26 mm dot pitch
On-screen menu-driven adjustments
Digital Autosync from 30-102 kHz 200 MHz Video Bandwidth
Exceeds MPR-II, TÜV, and TCO emissions standards
Full metal encasement for greater emissions containment

True, nobody's drawn a direct connection between video display emissions and longevity. But people are worried enough to have government-set limits on them. The strictest limits come from Scandanavia. So do the monitors that cut these emissions so low they can't even be measured: Nokia. Nokia monitors with MicroEmission® far surpass even TCO*—the toughest emissions standards in the world—with bonded display panels and full metal encasement.

Fine. But what does that leave you to look at?



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Well, Nokia MultiGraph® series monitors are arguably the most vivid in the world. In fact, the vast 21" unit achieves a 1600 x 1200 display at a remarkable 80 Hz refresh rate with 0.26 mm dot pitch. In other words: Huge, clear and absolutely flicker-free. The unique FullScreen® feature eliminates the dead border without edge distortion. The picture can be adjusted not just horizontally and vertically, but also trapezoidally and orthogonally. More impressively, the DigiControl™ on-screen menu-driven display adjustment can memorize your workstyle preferences (which is faster, easier, and far more precise than reaching for knobs hidden in the back somewhere.)

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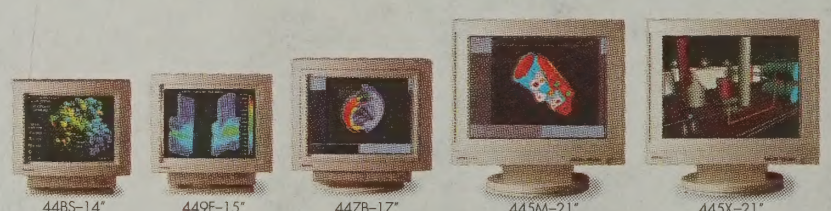

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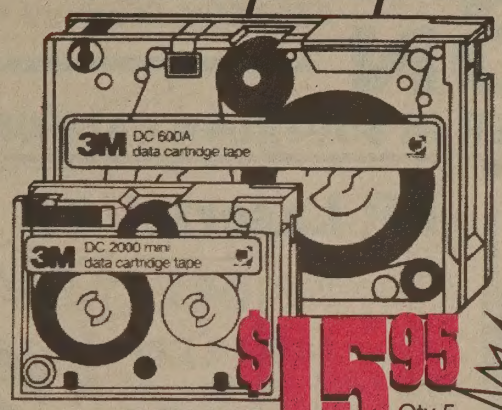

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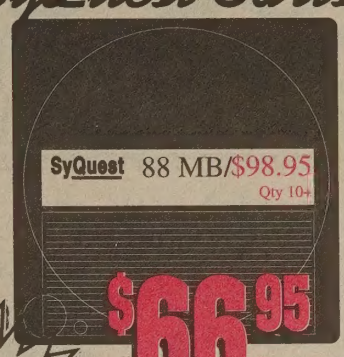

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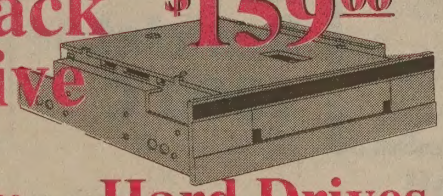

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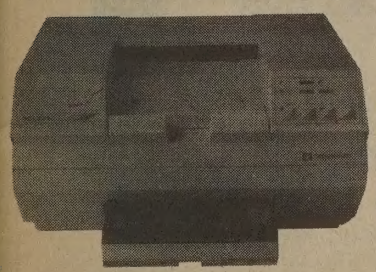

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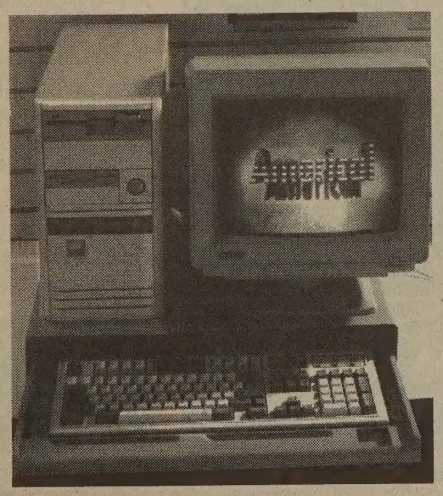

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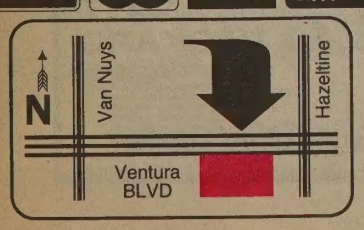

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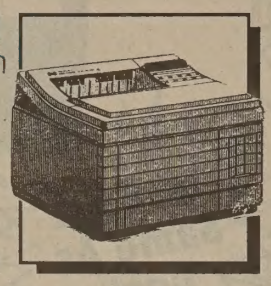

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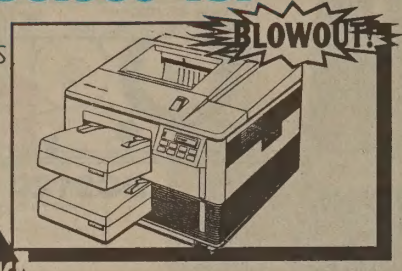

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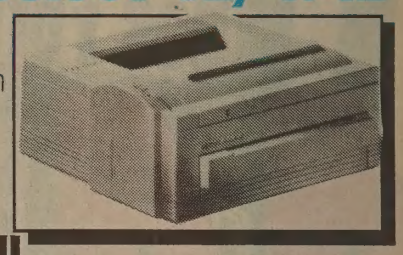

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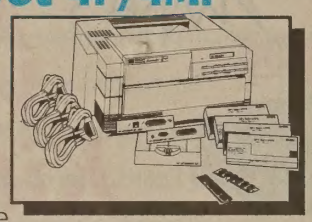

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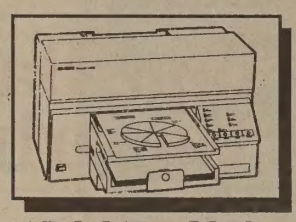

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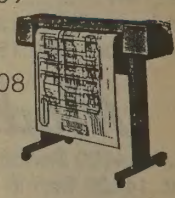

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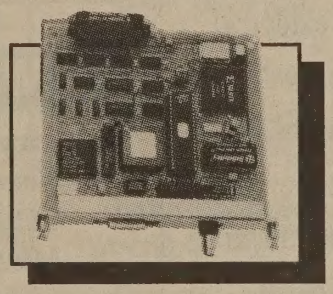

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TABLE OF CONTENTS

A NOTE FROM THE EDITORS

The Macintosh has changed our lives immeasurably—this magazine probably wouldn't exist without it.

In celebration of Mac's tenth birthday, we're pleased to bring you an extended interview with some of the key members of the original Macintosh team, now at General Magic working on the next generation of user-friendly technology. We hope you enjoy both the reminiscence and the looking forward.

—ME

From Mac To (General) Magic

COVER STORY

By Mary Eisenhart 76
Cover photo: Susana Millman

Macintosh pioneers address the emerging market for personal communicators, hoping to once again create the user-friendly difference between Mac and DOS.

NEWS & VIEWS

Industry Insight *By Paul Hoffman*.....12
New Intel chips drive price reductions.....12
CD-ROMs—Not Just For Multimedia.....14
MicroTimes Stock Index.....18

Realizable Fantasies *By Jim Warren*.....20
Further fulminations on software patents.

Letters.....27

From The Frontier *By Mitchell Kapor*.....28
Another perspective on Rich Karlgaard's Authoritarian/Libertarian grid.

Dvorak's Last Column *By John C. Dvorak*.....190
The unsung comedians of the Internet.

BUSINESS SOLUTIONS

Laptops *By Ed Kahn*.....30
Business card scanner and database; Sharp PC-8650 color notebook.

Los Angeles Reacts To The Earthquake
By Robert Moskowitz.....37
How telecommuting is working in the wake of the January 17 disaster.

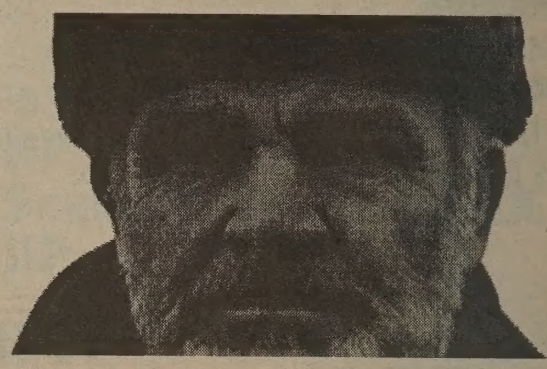
Tax Update For Technology Professionals
By David Simon, CPA, and Jennifer R. Cherniss.....46
New laws and regulations that affect nearly everyone.

FEATURES

Preview: LA Computer Fair.....53
Vendor exhibits, informative seminars, provocative speakers, and more in this year's premier event for Southland computer users.

MultiMedia & beyond

Multimedia 101 *By Jonathan E.*.....158
Violence in multimedia, and the games of Sanctuary Woods which try to avoid it.



Amiga *By Douglas J. Nakakihara*.....170
Commodore's CD32.

After The Quake.....54
After the Northridge earthquake, the computer community struggles to get back to normal.

PRODUCT SPOTLIGHT

Product Updates.....123

NEW PRODUCTS

PC Hardware
Image M-Line 486.....123
Anthurium Pentium PCI CADD Station...124
Digidesign SampleCell II.....124
NEC MultiSpin 4X Pro CD-ROM.....124

REVIEWS

Games
Dungeon Hack.....131
Master Of Orion.....134

RESOURCES

Calendar Of Events.....142
SampleCell II Demo.....142
Technologies And Persons With Disabilities Conference.....142
Los Angeles Computer Fair.....142
Corel World Design Contest.....142
Electronic Arts Scholarship Contest.....142

User Group Network.....150
BBS Spotlight: The Tavern

Classifieds.....179

Index Of Advertisers By City.....186

Index Of Advertisers.....188

Micro Marketplace
A Special Advertising Section For Southern California Computer Buyers Starts on Page 60

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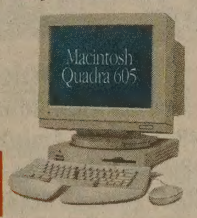

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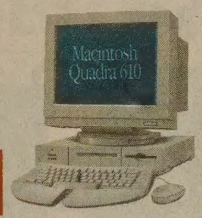

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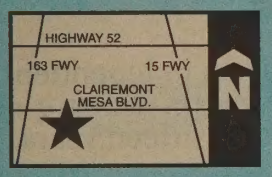

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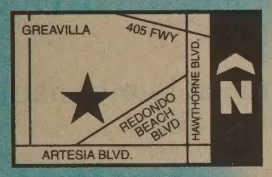

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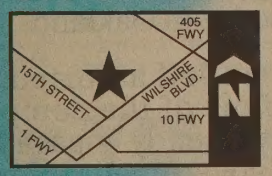

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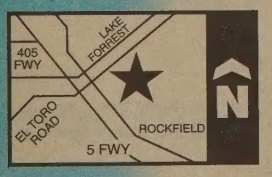

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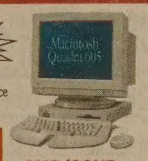

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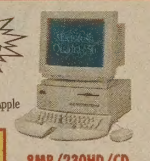

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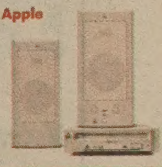

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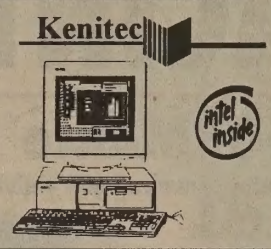

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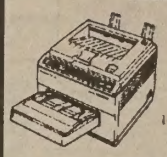

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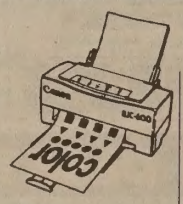

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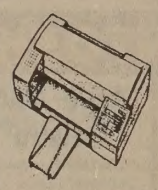

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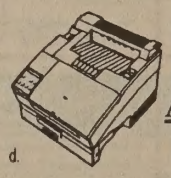

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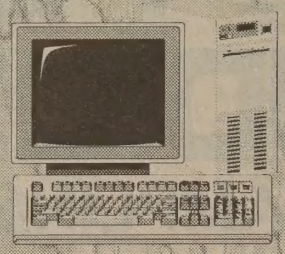

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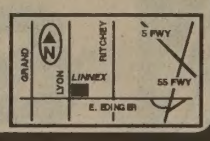

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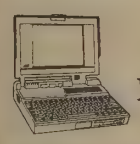

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INDUSTRY INSIGHT

Chips And CD-ROM

New Intel Chips Bring New Price Cuts

BY PAUL HOFFMAN

A slew of new CPU announcements from Intel portends another round of price-cutting in the coming months for both mid-range and high-end PCs. Because there will be too many chips with similar power for a single manufacturer to support, the new offerings will force PC manufacturers to make harder choices about which CPUs they will use. They will also put more pressure on Intel's competitors such as AMD and Cyrix to reduce their prices and add more features to their own chips to better define their differences from Intel.

The first announcement, and the one most important to high-end users, is the new DX4 series, based on Intel's 486 CPU. The first DX4 will run at 100MHz and will be about as fast as a 60MHz Pentium processor for integer applications. The big difference is that the DX4 will be much less expensive, and the support chips for it will also be less expensive, making the overall system about $500 less for comparable performance. The DX4 series is much easier and cheaper to manufacture, leading to the lower price.

The DX4 won't interest everyone, and it won't cannibalize a large part of the Pentium market, due to its lackluster floating point performance. Although the DX4 is about 30% faster than the 66MHz 486DX2 at floating point calculations (used in graphics, finance, and scientific work), it is only half as fast as the 6 MHz Pentium system for those calculations. For most day-to-day users, this difference is not that important because they don't do graphics-intensive work such as video production or a great deal of numerical calculations, and the DX4 computers will be very attractive. Intel insists that a large number of business users will soon want features such as video-conferencing and on-screen animation, and that they will want the Pentium for those tasks.

THE DOWNSIDE OF THESE ANNOUNCEMENTS IS THAT IT WILL PROBABLY MEAN MORE CONFUSION FOR PC DEALERS AND THE END-USERS.

The new chip has helped point out some of the problems with the current ratings for chip speeds. Although the Pentium was promised to be much faster than earlier Intel chips, much of that speed improvement required software developers to recompile their programs to take advantage of Pentium-specific features. Now that many developers have done this, they are finding only a small increase in the overall speed, not the 20–40% that many thought they would get. On the other hand, no one needs to recompile anything to take full advantage of the DX4's speed.

In the mid-range, Intel announced two new 486SX CPUs, dubbed 486SX2. The 50 MHz and 66MHz chips have twice the internal speed of the current 25 and 33MHz chips, and will yield almost twice the performance. This will put more pressure on Cyrix and AMD, who mostly compete with Intel at this end of the PC market. The new chips will be used both in portables and in mid- to low-range desktop computers. Within six months, they will probably cost about as much as their normal-speed counterparts do today, meaning that they will simply increase the speed that users demand at that price, not increase the price paid for the current speed.

Intel also announced very sketchy details about the P6 chip, due next year. They probably did this to blunt enthusiasm for the IBM-Apple-Motorola PowerPC chip that competes very well with the Pentium at a much lower price. The P6 will certainly be faster than the Pentium, but it is not clear how Intel plans to bring its price down—its complexity will be at least as great as the Pentium's, and thus its manufacturing cost will be at least as high.

In related news, AMD announced that it had snagged its first big-name client, Compaq. Until now, AMD and Cyrix had to settle for much smaller manufacturers who gave them plenty of money but not much profile. Now that Compaq has agreed to use AMD CPUs in a small number of their new systems, AMD will appear to be more of a real player to other PC manufacturers. This will especially help AMD's bid for mid-range computers, where Compaq is strongest.

The downside of these announcements is that it will probably mean more confusion for PC dealers and the end-users. In the case of the DX4, is it worth $500 to forego faster numerical calculations if you're pretty sure (but not absolutely sure) that you aren't going to use it two years from now? If you're a dealer, do you go with one manufacturer who has Pentiums and

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DX2s but no DX4s, or do you go with another who has DX4s but only one or two Pentiums? If you are buying a 486SX-class desktop computer, do you use the new Intel chips or those made by Intel's very worthy competitors?

A year from now, it is likely that the market will have weeded out some of the in-between processors, but until then PC buyers will be forced to make more difficult choices.

CD-ROMS: NOT JUST FOR MULTIMEDIA ANYMORE

Apple may have unwittingly created a new software distribution market five years ago when it started touting CD-ROMs and multimedia as the next big thing. Flush with its success at making desktop publishing a household word, Apple tried to get everyone to buy a CD-ROM player to watch and create interactive video.

CD-ROM's failure to produce even marginal video is now well known: you can really only sustain partial-screen video from most CD-ROM players, and even then the result is jerky.

However, millions of computer users have bought (and are still buying) CD-ROM players, based mostly on the false hope of video on their computer monitor. With all those CD-ROM players out there and not doing much, many companies are starting to take advantage of CD-ROMs for a somewhat different purpose: distributing regular software and other material. At the same time as people were buying CD-ROM drives under somewhat false pretenses, another phenomenon was happening in parallel: software (particularly Windows software) was getting bigger.

A few years ago, programs that took up ten or fifteen diskettes were laughed at, except by the people who had to tediously insert each one to install the new program. Now that CD-ROM drives are more common and the price of making even small pressings of CD-ROMs is quite low, many companies are offering their software on CD-ROMs instead of diskettes; some even offer discounts. For example, most popular PC-based flavors of UNIX come on CD-ROM as well as diskettes. Companies like BSDI even offer a $50 discount for buying their UNIX on CD-ROM.

Many mainstream software companies are going to CD-ROM as well. For example, Corel has recently lowered its prices on the CD-ROM-based versions of its software. The popular CorelDraw v4 has a suggested retail price of $600 for the diskette version, but $400 for the CD-ROM version. The same pricing is expected to be in place for CorelDraw v5, expected out in May of this year. Corel's Ventura page-layout programs is $250 on diskette, and $200 on CD-ROM.

At the same time, there is a mini-boom in distributing software on CD-ROM by many retailers. Apple was the first out of the gate with its Software Dispatch CD-ROM, and many large retailers and mail-order companies are now releasing similar products. With these packages, you get the CD-ROM for free or for a small price, and you unlock individual programs on the CD by calling an 800 number and buying the software with your credit card. Of course, the CD-ROM vendors only include software that the manufacturers allow.

Some customers have been a bit disappointed with the limited range of software on the disks, while others enjoy the ability of trying out preview versions before purchasing. For instance, on the Apple CD-ROM, some programs let you run them a few times before you buy, while others only let you run a crippled demonstration version of the software. The documentation is only available online, another disadvantage for many people. This system of software distribution has been most popular for font vendors, who include hundreds of fonts on a single CD-ROM. ■

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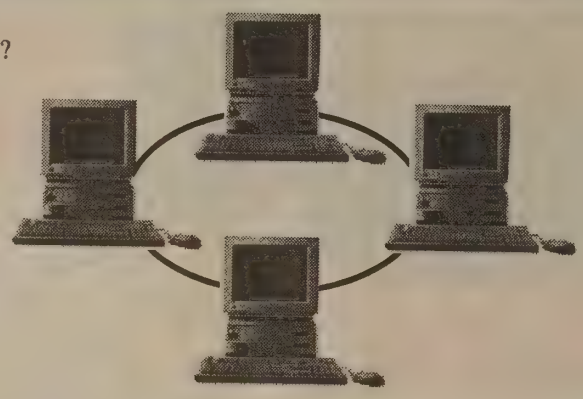

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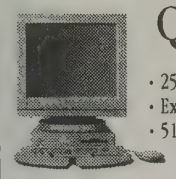

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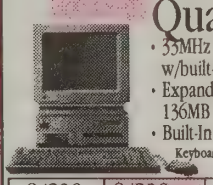

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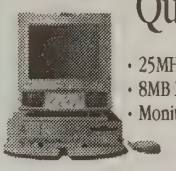

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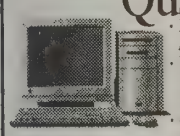

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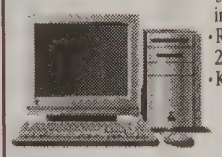

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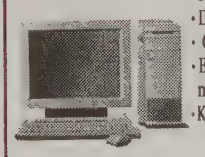

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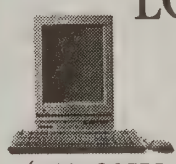
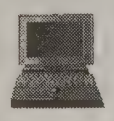


- 25 MHz 68030 processor
- Expandable up to 36MB's of RAM
- Keyboard included
- Monitor Not Included
- Original Hard Disk

4MB/80HD **$693***
4MB/160HD **$849***

*With Purchase of Claris Works 2.0 at $189

Apple Macintosh PowerBook Duo™230



- 68030 Processor
- 33MHz
- 4/80/Floppy & Adapter

$1339*

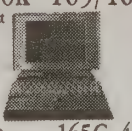
*With Purchase of Claris Works 2.0 at $189.

Apple Macintosh PowerBook® 145B

- Solid Macintosh Performance and Flexibility Built In!
- Ergonomic Design!
- Original Hard Disk

4/80 **$1299**
4/120 **$1539**

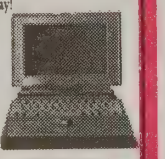
Apple Macintosh PowerBook®165/165C



- Color Video Output
- 33MHz 68030 Microprocessor
- Original Hard Disk

165 4/80 **$1629**
165C 4/80 **$1599**

Apple Macintosh PowerBook® 180



- Gray Scale Active Matrix Display!
- Color Video Output!
- High Performance & incredible speed
- Includes Floppy!
- Original Hard Disk

4/80 **$1950***

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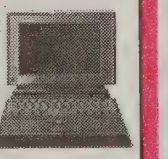
Apple Macintosh PowerBook® 180C

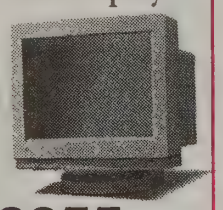


- NEW COLOR ACTIVE MATRIX
- A member of the portable Macintosh product line
- Original Hard Disk

4/80 **$2249***

*With Purchase of Claris Works 2.0 at $189.

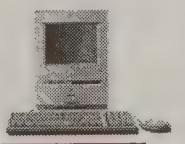
Apple® Macintosh® 21" Color Display



- With ADP Ports

$2355

Apple® Macintosh® Color Classic®

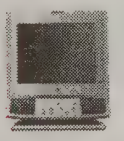


- Displays up to 256 Colors on a built-in Trinitron Screen
- Includes Keyboard!

4/80	4/80
$859	$758*

*With Purchase of GreatWorks/Quicken Bundle for only $189

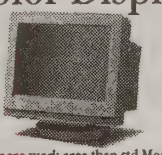
Apple® AudioVision™



- Built-in stereo speaker and microphone
- New monitor combines superb color with great sound
- 14" color display
- 640 x 480 resolution

$669

Apple Macintosh®16" Color Display



- up to 70% more work area than std Monitors
- Three ADB Ports

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NEW — Apple Macintosh®Color Plus 14" Display

- .28 Dot Pitch
- 640x480 resolution

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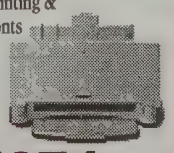

- 360 dots-per-inch quality
- Grayscale printing & 35 built-in fonts

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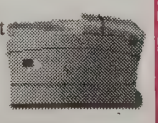
Apple LaserWriter Select™ 310



- 300DPI
- 5 Pages per minute
- 1.5MB Ram
- Adobe Postscript Level 1
- w/Toner

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Apple LaserWriter Personal™ 320

- 300DPI
- 4 Pages Per minute
- 2MB of Ram
- w/Toner

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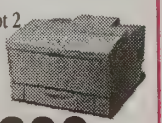
New Apple LaserWriter Select™ 360



- 600 Dot per inch
- 10 Pages Per minute
- 7MB Ram
- Adobe Postscript 2
- w/Toner

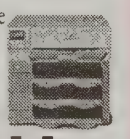
$1399

Apple LaserWriter® Pro 630

- 600 DPI
- 8 Pages per minute
- 8MB Ram
- Adobe Postscript II
- w/Toner

$1899

Apple LaserWriter® Pro 810



- 300, 400 (default) 600 or 800 DPI
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- 64 Scalable Fonts

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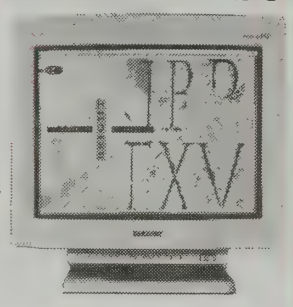

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- Includes color temperature control for publishing, photography, imaging, and design applications
- Swedish MPR II compliant

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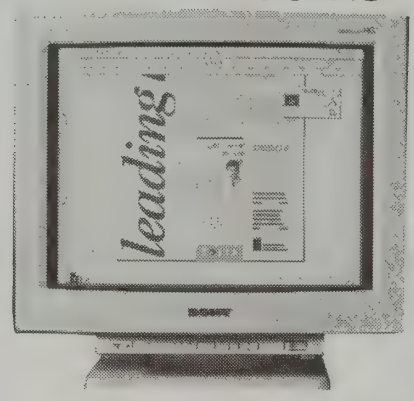

- **Mac Compatible**
- 20" Super Fine PitchTM Multiscan® Trinitron® color graphics display monitor
- .30mm Aperture Grille pitch
- Maximum resolution of 1280 x 1024 refresh (non-interlaced)
- Variable scan frequency of 30 to 71 kHz

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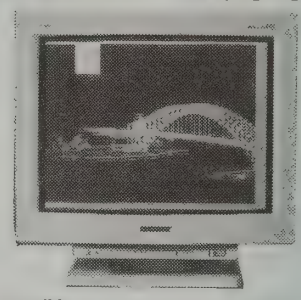
GDM 2038



- **Mac Compatible**
- 20" Super Fine PitchTM Multiscan® Trinitron® color graphics display monitor
- .30 mm Aperture Grille pitch
- Maximum resolution of 1280 x 1024 at 80 Hz refresh (non-interlaced)
- Variable scan frequency of 28 to 85 kHz
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- Sony Display Memory System provides easy-to-use digital control of screen images
- Includes color temperature control for publishing, photo and design applications
- Full compliance with Swedish MPR II standards for VLF/ELF magnetic and electrical emissions

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Sony CPD-1320

- **MAC Compatible**
- 14" Super Fine Pitch™ Trinitron® Multiscan™ monitor
- .25mm Aperture Grille pitch
- Resolution of 640 x 480 (VGA)
- Scan frequency of 31.5 kHz
- Includes VGA cable and tilt/swivel stand

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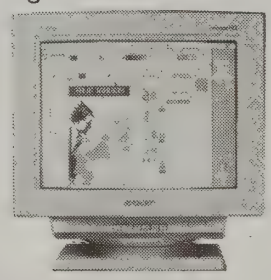
Trinitron Digital Control Color Monitor



- **Mac Compatible**
- 14" Super Fine PitchTM Multiscan® Trinitron® color display
- .25mm Aperture Grille pitch
- Maximum resolution of 1024 x 768 at 72 Hz refresh (non-interlaced)
- Variable scan frequency of 28 to 58kHz
- Overscanning for crisp edge-to-edge images
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- Full compliance with Swedish MPR II standards for VLF/ELF magnetic and electrical emissions

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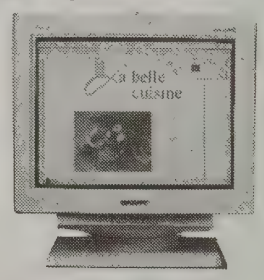
Trinitron Digital Control Color Monitor



- **Mac Compatible**
- 17" Super Fine PitchTM Multiscan® Trinitron® color display
- .25mm Aperture Grille pitch
- Maximum resolution of 1024 x 768 at 72 Hz refresh (non-interlaced)
- Variable scan frequency of 28 to 59 kHz
- Overscanning for crisp edge-to-edge images
- Sony Display Memory System provides easy-to-use digital control of screen images
- Full compliance with Swedish MPR II standards for VLF/ELF magnetic and electrical emissions

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FED RAISES INTEREST RATES - DOW TAKES A DIVE

Expectations of higher interest rates became a reality during the week ended February 4, much to the detriment of US stocks. After two days of deliberation, the Federal Open Market Committee (FOMC) voted to raise the Federal Funds rate to 3.25% from 3%. The FOMC's decision to raise short-term interest rates pummeled Wall Street as the Dow posted a one-day drop of 96.24 points. Higher interest rates also make stocks less attractive because they raise concern about the growth in the economy and corporate profits. Higher interest rates also make fixed-income invesments more favorable, as opposed to the stocks. For the monthly period ended February 4, however, the Dow Jones Industrial Average gained 50.65 points, to end at 3871.42.

The MicroTimes Stock Index, on the other hand, lost 137.77 points, or 2.83%, to close at 4728.74.

Compaq Computer Corp. said its fourth-quarter earnings surged 70% amid rising demand for desktop and portable computers. The personal computer company reported record profits of $151 million, or $1.74 a share, from $89 million, or $1.11 a share, a year earlier. Revenue also advanced to $2.2 billion, up 57%, from $1.4 billion a year ago. Shares of Compaq jumped $7.50 per share, to close at $85.25

Digital Equipment Corp. (DEC) was lowered to "market performer" from "trading buy" by Goldman Sachs and Co.'s analyst Barry Willman. The rating on the company's bonds was also lowered by Moody's Investors Service Inc. to "Baa3" from "A3", on $1 billion of DEC's senior long-term debt. As a result, the company is considering its second major reorganization plan. DEC shares closed at $29.13, down $7.25 per share.

Shares of Dell Computers lost $5.75 per share, as the personal computer manufacturer suffered a reduction of earnings estimate by Melinda Reach, an analyst with Merrill Lynch & Co. Reach lowered her earnings estimate for the fourth-quarter ended January 31 to a figure between $0.10 to $0.30 per share, from $0.40 a share. She also lowered her fiscal 1995 forecast to $1.65 a share, from a previous estimate of $2.25 per share. The PC concern closed at $20.00.

AST Research Inc. closed at a 52-week high of $28.75 per share, after the world's fifth-largest computer company posted a 22% jump in second-quarter earnings. Net income in the second quarter rose to $17.9 million, or $0.55 a share, from $14.6 million, or $0.46 a share, in the year-earlier period. The increase in earnings was partly fueled by AST's acquisition of Tandy Corp.'s PC manufacturing business. Consequently, AST was raised to a "buy" from "neutral" by Steve Eskenazi, an analyst with Alex Brown & Sons. AST shares were up $5.13 per share.

EXCH	COMPANY		TICKER SYMBOL	CLOSING PRICE 01/07/94	CLOSING PRICE 02/04/94	NET CHANGE IN PERIOD	PERCENT CHANGE IN PERIOD	P/E RATIO	ANNUAL DIVIDEND RATE	ANNUAL DIVIDEND YIELD	ANNUAL HIGH	ANNUAL LOW
	SOFTWARE											
OTC	Adobe		ADBE	26.25	27.25	1.00	3.81	22	0.20	0.73	37.00	16.25
OTC	Aldus	(H)	ALDC	25.50	21.25	–4.25	–16.67	30	0.00	0.00	27.75	13.50
OTC	Autodesk		ACAD	45.88	48.75	2.88	6.27	21	0.48	0.98	56.75	37.00
OTC	Borland		BORL	15.00	13.25	–1.75	–11.67	25	0.00	0.00	27.25	12.75
OTC	Informix		IFMX	19.00	17.13	–1.88	–9.87	21	0.00	0.00	27.25	13.38
OTC	Lotus	(H)	LOTS	59.25	55.50	–3.75	–6.33	45	0.00	0.00	61.38	22.38
OTC	Microsoft		MSFT	85.25	81.25	–4.00	–4.69	24	0.00	0.00	98.00	70.38
OTC	Novell		NOVL	21.75	21.63	–0.13	–0.57	–	0.00	0.00	35.25	17.00
OTC	Oracle		ORCL	31.75	31.25	–0.50	–1.57	46	0.00	0.00	37.75	13.31
OTC	Software Publishing		SPCO	8.00	7.50	–0.50	–6.25	–	0.00	0.00	14.50	5.50
OTC	Symantec		SYMC	15.88	15.00	–0.88	–5.51	–	0.00	0.00	20.50	9.25
	HARDWARE											
OTC	Apple		AAPL	33.13	33.38	0.25	0.75	–	0.48	1.44	59.13	22.00
OTC	AST Research	(H)	ASTA	23.63	28.75	5.13	21.69	–	0.00	0.00	31.25	12.75
NYS	Commodore		CBU	3.75	3.13	–0.63	–16.67	–	0.00	0.00	6.38	2.50
NYS	Compaq	(H)	CPQ	77.75	85.25	7.50	9.65	16	0.00	0.00	88.75	41.75
NYS	Digital Equipment	(L)	DEC	36.38	29.13	–7.25	–19.93	–	0.00	0.00	49.25	29.13
OTC	Dell		DELL	25.75	20.00	–5.75	–22.33	–	0.00	0.00	40.63	13.50
NYS	Hewlett–Packard		HWP	83.00	81.00	–2.00	–2.41	17	1.00	1.23	89.25	64.38
NYS	IBM		IBM	58.88	52.00	–6.88	–11.68	–	1.00	1.92	60.00	40.63
NYS	Silicon Graphics	(H)	SGI	23.88	25.13	1.25	5.24	33	0.00	0.00	26.00	11.75
OTC	Sun Microsystems		SUNW	29.63	25.50	–4.13	–13.92	14	0.00	0.00	36.50	21.13
NYS	Xerox	(H)	XRX	90.75	95.00	4.25	4.68	16	3.00	3.16	98.63	69.88
NYS	Tandy		TAN	46.63	44.88	–1.75	–3.75	26	0.60	1.34	50.75	24.63
	CPU'S											
NYS	Advanced Micro Devices	(L)	AMD	18.38	20.38	2.00	10.88	9	0.00	0.00	32.88	16.75
OTC	Intel		INTC	65.88	61.75	–4.13	–6.26	12	0.20	0.32	74.50	42.75
NYS	LSI Logic	(H)	LSI	16.63	17.63	1.00	6.02	16	0.00	0.00	19.38	10.25
NYS	Motorola		MOT	89.63	95.25	5.63	6.28	27	0.56	0.59	107.50	52.25
	COMMUNICATIONS											
NYS	AT&T		T	54.63	54.88	0.25	0.46	18	1.32	2.41	65.00	51.63
NYS	BellSouth Corp.		BLS	55.50	56.63	1.13	2.03	27	2.76	4.87	63.88	50.63
OTC	MCI		MCIC	27.38	26.50	–0.88	–3.20	24	0.04	0.15	29.88	18.81
NYS	Northern Telecom		NT	32.63	30.38	–2.25	–6.90	–	0.36	1.19	46.00	21.38
NYS	Pacific Telesis		PAC	54.25	55.25	1.00	1.84	–	2.16	3.91	59.25	44.88

KEY: NYS = NEW YORK ASE = AMERICAN OTC = OVER THE COUNTER
(H) = NEW HIGH REACHED IN PERIOD (L) = NEW LOW REACHED IN PERIOD

MARKET DIARY:

ADVANCES	13
DECLINES	19
UNCHANGED	0
NEW HIGHS	7
NEW LOWS	2

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LARGEST DOLLAR GAINER	Compaq	$ 7.50
LARGEST DOLLAR LOSER	Digital Equipment	$ –7 25
LARGEST PERCENTAGE GAINER	AST Research	21.69 %
LARGEST PERCENTAGE LOSER	Dell	–22.33 %

	CLOSE 01/07/94	CLOSE 02/04/94	NET CHANGE IN PERIOD	PERCENT CHANGE IN PERIOD
MICROTIMES STOCK INDEX	4866.50	4728.74	–137.77	–2.83
DOW JONES INDUSTRIAL AVERAGE	3820.77	3871.42	50.65	1.33
STANDARD & POOR'S 500 INDEX	469.90	469.81	–0.09	–0.02
N.Y.S.E. COMPOSITE	260.34	261.21	0.87	0.33
NASDAQ COMPOSITE	782.94	777.28	–5.66	–0.72

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DATE	MICRO TIMES	DOW JONES
06/24/93	4266.52	3490.61
07/22/93	4072.42	3525.22
08/23/93	4264.70	3605.98
09/17/93	4212.67	3613.25
10/18/93	4473.13	3642.31
12/17/93	4644.25	3751.57
01/07/94	4866 50	3820.77
02/04/94	4728.74	3871.42

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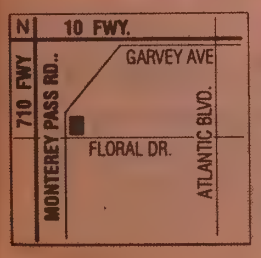

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The Software-Monopoly Lunacy

Write A Routine; Fork Over A Fee

BY JIM WARREN

These columns concern what isn't, but could be—in this case, for the worse, unless we act *now.*

Last September's column was ever-so-politely titled, "Software Patents SUCK!" But I had no *idea* how bad the situation was. Folks have sometimes accused me of losing my mind, but I sure as hell didn't expect to lose it to 17-year monopolies.

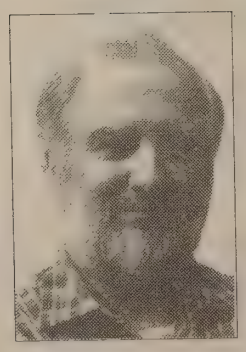
EVERYBODY IS SCREWED!

(Everyone, that is, except the intellectual-property lawyers and litigators.)

Want to write a macro in QuattroPro or Excel? Better check with your lawyer, first. Write it in 1-2-3? Ask Lotus for the names of the other spreadsheets in which they will permit you to use "their" macro that you write. Better get their permission in writing.

REALIZABLE FANTASIES

Thinking of building a command file? Your control sequence may be patented—for 17 years. And Gawd forbid you might want to write a real, honest-to-goodness subroutine, object module, or (*gasp!*) computer program—but *surely* not before you finish Law School.



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CONSTITUTION BE DAMNED

The Constitution authorizes patents "To promote the progress of science and useful arts." See if you think this qualifies:

Doug Brotz, Principal Scientist for Adobe—with a Stanford Ph.D. in Computer Science and extensive research experience at exotic Xerox Palo Alto Research Center (X-PARC)—wrote the first PostScript interpreter while Adobe guru John Warnock whispered in his ear. But now, he doesn't have time to promote progress. His full-time assignment is to advise Adobe's defense attorneys and watch out for software monopolies. Note: Adobe strongly opposes software patents.

Paul Heckel—once a diligent technical innovator—got a patent on a software innovation. But he was neither wealthy nor a patent lawyer. So he has spent most of the past decade in bitter, often unsuccessful efforts to defend his "property." Time, energy, and resources diverted from innovation that could promote progress and earn him rewards, if he had just not believed in patent protection. (Similarly, television's inventor and patent-holder never received a penny, even after years of litigation. Xerography's inventor and patent-holder didn't get any money until he was a bitter old man.)

Microsoft reportedly spent $25 million to license IBM's software-patent portfolio—but not for use; just for defense. Sun won't even *say* how many millions *they* paid to license IBM's patents. Autodesk has already blown over $1 million successfully fighting off sixteen patent claims made against it with endless frivolous claims and litigation guaranteed by software patents.

More and more financial resources and technical talent are being wasted on filing and defending against such patent claims, endless searches for prior art (which invalidates patents), endless depositions, and endless trials.

Lotsa loot for lawyers, but none for progress.

REPLACING PROGRESS WITH POSSESSION

For computing's first 35 years or so, computer algorithms couldn't be patented. Then, in *Diamond v. Diehr*, the US Supreme Court permitted the patent of a rubber-mold system controlled by a program that implemented a well-understood algorithm. And the lawyers' feeding frenzy began.

A decade later, in 1991 alone, there were sixty-six hundred software-patent applications filed. In 1992, there were seventy-five hundred. Last year, it increased to eighty-three hundred.

IBM reportedly holds the most patents controlling everything that works like their software monopolies. AT&T may be second. Benevolent Billie's Microsoft is comin' up fast. Several Japanese corporations are pursuing software research, reportedly filing for US patents on every semicolon and comma.

Patent monopolies last six years longer than the IBM PC or Mac have even existed, and are retroactive to the beginning of time.

DELUSION OF DISCLOSURE

The theory of patents is that the required public disclosure accompanying their monopoly protection will promote progress by permitting others to see how innovation was accomplished.

But computer users and programmers and innovators are prohibited from knowing anything about the software-patent applications that threaten them for at least one year—often three to five years or more after they are filed—because patent applications in the US (but not in many other countries) are secret until they are granted.

In an industry with a half-century tradition of eager sharing—allowing us all to stand on each others' shoulders, rather than on each others' toes—we are beginning to hear programmers cringe and bleat that they can't talk about what they are doing because it's tied up for a few years in a secret patent application.

And the government actually pretends this "promotes progress."

HEARINGS: WAIT & HURRY UP

Actually, the Patent and Trademark Office (PTO) probably knows better—but it's so

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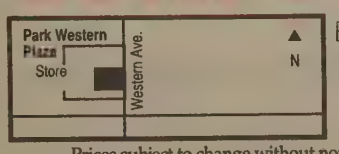

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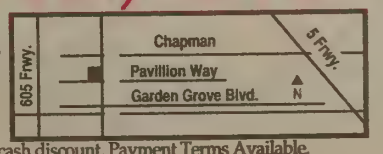

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glutted with intellectual-property attorneys that it can't conceive of the notion of *not* patenting the mind's methods for solving intellectual problems if mimicked by machine.

Nonetheless, in October, ex-corporate-lobbyist Secretary of Commerce Ron Brown and his staff were thoroughly torched by software progress-producers screeching about the software-patent nightmare. Brown's new Patent and Trademark Commissioner, Bruce Lehman, promised to hold hearings on the problem.

All of November—nary a word. Halfway through December, still nothing. Then, four days before Xmas Eve began the year-end unwork period, the first notice of January hearings appeared in the *Federal Register.* (In fairness, a staffer said they had submitted the information three weeks earlier. Maybe they didn't know about the *Register*'s delays.)

Hearings were scheduled in San Jose for January 26–27, and for February 10–11, safely back in the arms of Washington's Beltway Bandits (in Arlington, VA).

(In one San Jose comment, PTO Commissioner Lehman even referred to coming to California as a "junket" that he didn't want him or his staff to do very often. And, my fellow California hicks, Lehman is reputed to be one of the *good* guys—*honest!*)

PTO'S BIASED HEARINGS

The title of the hearings illustrated how the deck was stacked: "Public Hearings on Patent Protection for Software-Related Inventions."

Have *any* of our two hundred thousand-plus readers *ever* seen that phrase—"software-related inventions"—in *any* computer publication, *except* in the context of legal efforts to pervert the patenting of gadgets so as to monopolize machine-assisted intellectual processes?

Some folks said the San Jose hearings were nothing but a political sop to Silicon Valley—that they had already decided software patents were "good" and were just trying to figure out how best to nail the coffin shut. Actually, I got the impression Lehman and his staff were sincerely interested in trying to nibble at some of the more outrageous problems, but that he wasn't about to favor returning software to its patentless status that produced *all* of computing's progress prior to the past few years.

It's Alive!

State Legislative Information Now Online

Many of my columns last year concerned efforts to pass AB1624 (by Bowen, D-Torrance) to make all state legislative information—bills, amendments, agendas, votes, etc.—plus all state statutes and the baroque state Constitution available via the Internet, without any state charges. It's now law—Calif. Govt. Code 10248. And it's now live—available by "ftp" for those with access to the Internet's file-transfer protocol, and by "ftpmail" for anyone who can at least send and receive mail to an Internet address.

"For A Good Time, Call..."

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If you already use an Internet host and are familiar with "ftp," you can begin by retrieving about a dozen self-evident **README** files and about four self-evident **index** files by:

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For "Full" Internet Access

Now, now—no whining about the Legislature not providing every kind of access you can dream up, e.g. **telnet**, exotic indexers and search tools, etc. Their job is to support the Legislature; it's not to spend vast sums fulfilling each citizen's techno-whim. They are running a relatively low-cost system with minimal staff, and are providing the information for free, in a form they can generate easily, that almost everyone can use—ASCII. (Hmmm, who will be the first to auto-convert it to 6-bit Baudot-code for the low-cost terminals that are popular among the hearing-impaired? Lemme know, and I'll publish it.)

There are already a number of Internet sites that are pulling all files across from the legislative system and will be offering usually free access via standard Internet indexing, searching, reading, and retrieval tools—**gopher**, **WAIS**, **WWW**, etc. To receive ongoing details, read on.

For 'Net Novices

It's also not the Legislature's job to teach folks how to use the Internet—no more so than it is CalTrans' job to teach people how to drive and where to find filling stations. Two of the best tutorials and handbooks for novices about the Internet are: *The Whole Internet: User's Guide and Catalog,* by Ed Krol, from O'Reilly & Associates, 1-800-998-9938; and *Zen and the Art of the Internet,* by Brendan Kehoe, from Prentice Hall.

Updates & What's Next

Making legislation available online and without state fees was last year's project—done! This year, we want to mandate timely, online access to political disclosures—state and local campaign finances and officials' declarations of their economic interests, plus state lobbyists disclosures. Watch this column for progress reports.

But such things move much too fast for a monthly magazine to do anything more than report history. To be informed in time to participate in the process—rather than just snarl about the results—have your email address added to my online "GovAccess" distribution list. Just send a request to me, **jwarren@well.sf.ca.us** (no period at the end).

—Jim Warren

continued on page 69

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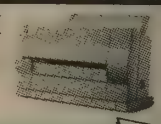

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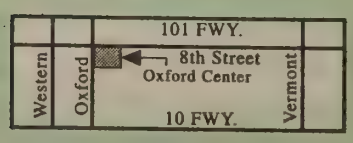

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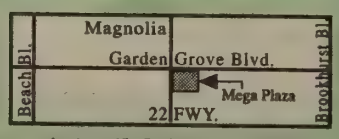

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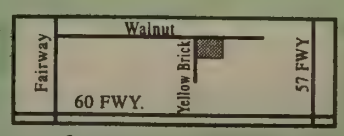

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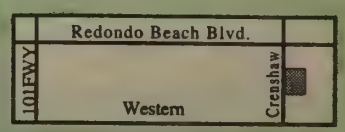

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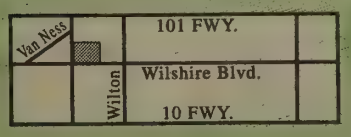

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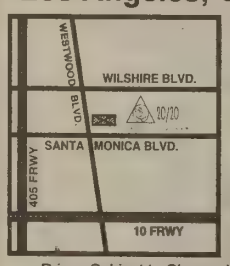

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Letters

PHOOEY ON FORBES

I stumbled on Rich Karlgaard's article "NAFTA's Strange Bedfellows: It's Only the Beginning" as I raced through your January issue. Why wasn't there a notice saying "paid political advertisement" near it? Such poor rhetoric has little place in a magazine that should aspire to help others reason well in assessing their place in the chaos generated by current technological developments.

Poor simplistic dichotomies like "authoritarian/libertarian" (isn't anarchy the opposite of authority? don't most Libertarians, as a party, believe in the institution of government?) don't elucidate the darker side of political wheeling and dealing. It could be argued that Mr. Karlgaard intends to reach out to members of the liberal, college-educated baby boomers and pull them towards *Forbes* magazine by arguing that they are libertarians like *Forbes* magazine, not democrats, socialists, etc. Placing Jerry Brown in a different category than organized labor would certainly be news to him, and regarding Ronald Reagan as a libertarian when he supported tyranny in El Salvador and resisted the breakup of the giant AT&T monopoly seems ludicrous. Reagan was a right-wing authoritarian, who did what he could to undermine the Freedom of Information Act in his eight years in office.

Karlgaard's use of percentages is misleading when applied to Moore's Law. Moore's Law would require the software being used and its application to be constant in order to have relevance. When 90% of the world's users are doing word processing, doesn't that skew the statistic? Large corporations almost never used their computers for writing letters, publishing annual reports, etc., in the 1970s; they had larger fish to fry and more customized software to help them do it. Democratization of part of the means does not mean democratization of the ends.

Alvin Toffler mentioned a few of the information tactics that are currently being exploited that use information as a weapon to be manipulated and used against its recipients. He also mentions how people with an agenda weight different variables to skew the results.

Let's commit ourselves to clear-headed problem solving and doing our utmost to maintain an unbiased discussion of the information age and its technology.

Ian Webster
San Francisco

To address Mr. Webster's last point first, we believe the notions of non-agenda-driven information and unbiased discussion are simply oxymoronic. The Tofflers' larger point is that all communication is agenda-driven, consciously or otherwise; all humans are inescapably prisoners of the deliberate or unconscious editorial decisions and goals of all the other humans who produce and process information. Political advisors skew the information they present to officials; columnists and academics play up the facts that support their theses and downplay those that don't; scientific research results proceed inevitably from the project's design; and so on. We are all constrained by the filters of our own experience and the unknown filters through which information comes to us.

The only fix for this, as the Tofflers also noted, is to get more information, from sources as diverse as you can manage. To the extent that this magazine has aspirations and philosophical commitments, that's what we're trying to do. We're not in the One True Path business; we're in the business of letting a wide range of people present their experiences and letting the readers decide for themselves the relevance and accuracy of this information in their own lives, from OS wars to legislative wars.

We do tend to agree with Karlgaard (to say nothing of our friends at the Hackers Conference) that the personal computer was born of a fundamentally anti-authoritarian impulse and that it has had an incalculable effect in allowing individuals to evade monolithic structures and live and work in ways they find personally fulfilling. While Mr. Webster is quite correct in asserting that this effect is still far from universal, it would take an act of willful perversity to ignore all the barriers the personal computer has broken and, in accordance with Karlgaard's thesis and Moore's Law, will go right on breaking.

As the next letter illustrates, though, we're clearly not there yet.

For another perspective on Karlgaard's editorial, see Mitch Kapor's article on page 32.

—ME

WHAT ABOUT THE REST OF US?

Through various temporary and volunteer jobs, I have had my nose rubbed in computers, both PCs and Macs. What I do is strictly "monkey see, monkey do," and I have only a glimmer of how to use them and their software properly.

I read your publication in hopes of being enlightened, but I don't know any more than when I started. You are truly preaching to the converted. Can't you spare at least one column for us Great Unwashed, who regularly deal with computers in abysmal ignorance?

We can't waste time fooling around with games and virtual reality; our everyday reality is quite enough to deal with! Good old Sears sells computers these days right there with washers and refrigerators, but we peasants only feel secure in shopping for the latter which we know are useful to us.

Think of the market that would open up if we weren't computer-ignorant! Free publications like yours have an educational duty.

Catherine Borka
Santa Cruz

Ms. Borka's letter raises a lot of provocative points and certainly illustrates the fact that while the personal computer has been a godsend to lots of folks, computers in general remain pretty alien and scary to large portions of the population.

"We peasants only feel secure in shopping for [things] we know are useful to us," she says. Well, it may be heresy, but there are a whole lot of people out there who don't need a computer and never will, and "peasantry" doesn't have a thing to do with it. Many of them will realize the benefits of the Information Age through TV-like rather than computer-like devices, to great and far-reaching effect.

And this, we think, is fine. We don't think anybody should go out and buy a computer without having some idea of what they want to use it for. Until it's a necessary component of something you want to do, you don't need one, all the hype in the universe notwithstanding.

That said, all of us were beginners once. Bill Gates was a beginner once. And there are a lot of beginners and potential beginners out there in search of ideas for how to use their computers more effectively, and why a computer might be useful in the first place.

Once or twice in the last few years we've had a series of beginner-oriented columns, and we're certainly open to the notion of doing it again. In order to make such a column useful, since the choices have become a good deal more complex since then, we'd like to explicitly invite feedback from our readers as to what they'd like to see in it.

Please let us hear from you.

—ME

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From The Frontier

Anti-Authoritarians On The Info Highway

BY MITCHELL KAPOR

Rich Karlgaard wisely observes ("NAFTA's Strange Bedfellows," Issue #118): *...the range of political opinion in the US is not always spread along a single axis of left to right. I believe there is another axis ascendant: authoritarian/libertarian. Try this exercise. Draw a left-to-right line across a page. Then draw a vertical line from top to bottom, labeling it Authoritarian on top, Libertarian on bottom. You have just created a grid with four quadrants.*

I have tried to illustrate his point.

Karlgaard's two axes:

I want to substitute "anti-authoritarian" for "libertarian," as follows:

Doing this permits distinguishing two varieties of anti-authoritarian, the decentralist and the libertarian.

Copyright © 1994 by Mitchell Kapor. All rights reserved. *Mitchell Kapor is the cofounder and chairman of the Electronic Frontier Foundation.*

As Rich indicates, on some issues, like NAFTA (and, I might add, the Clipper Chip), the opposing sides are divided, not on liberal-conservative political lines, but on the horizontal axis.

I would claim that the lower half of the political space should simply be called anti-authoritarian, and that it is divided into two quadrants: on the left, the decentralist, and on the right, the libertarian.

You can see how this works on Clipper chip and other privacy issues related to encryption. EFF chairs a coalition of sixty organizations, from the American Petroleum Institute to the ACLU, which opposes government control of encryption. You have cypherpunks and corporate interests aligned on this issue, because they all want decentralization of control over encryption technology.

On issues where the goal is to remove government-imposed barriers, like privacy, there is easy agreement between left-leaning decentralists and right-leaning libertarians. The coherence of EFF's Board resides in the libertarian-decentralist commonality of interest which is more important than conventional divisions of left-right politics.

INFRASTRUCTURE ISSUES

On the other hand, the sometimes fractious nature of the public interest community, of which EFF is part, can be seen in splits along the same horizontal axis. EFF supports private sector ownership and operation of the National Information Infrastructure. Many other public interest organizations share the same general goals of openness for the NII as EFF, but prefer approaches lying above the horizontal midline, e.g., through direct government ownership or operation of the NII.

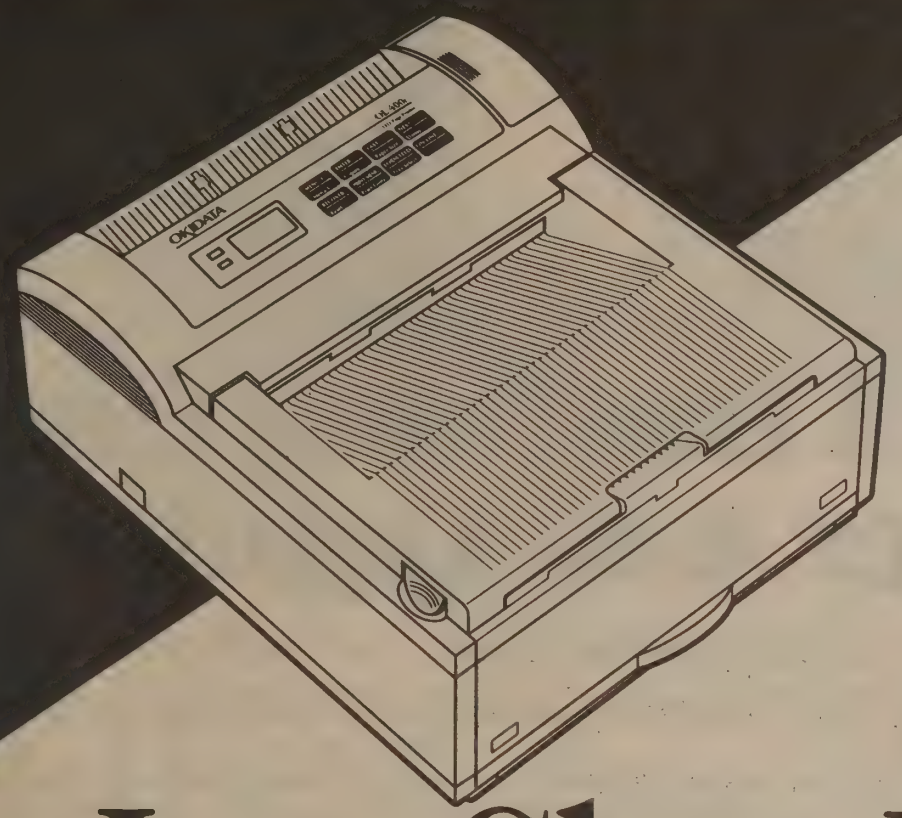
Infrastructure is a trickier issue than privacy. All anti-authoritarians would agree that a government-built NII is the wrong approach. However, there seems to be more willingness among many on the net who think of themselves as libertarians to leave it entirely to private industry to build the NII, where government abandons any role, even as referee. If we wound up with an NII controlled by an oligopoly of enormous corporate interests which resulted in centralized control over content, it would be a bad thing. If independent content providers can't easily get on the network, it would be a huge catastrophe.

It seems to me that, in principle, corporate authoritarianism is as dangerous as government authoritarianism, and this is an issue which may separate left-quadrant and right-quadrant anti-authoritarians.

A libertarian would argue that if government got out of the way, e.g., deregulated telecommunications and let everybody compete, that would be sufficient to achieve the right kind of NII. Personally, I think that's naive. A more considered libertarian view would be that either the market will produce the desired result by itself or it won't, but there is nothing anybody can do to alter the outcome. Thus government should stay out of it, and the public interest community should go home. To me, this is both fatalistic and simplistic.

A decentralist would say that deregulation alone is not necessarily going to be sufficient to produce a decentralized NII. It might be and it might not. But if it is not, we do not need to be fatalists about it. We have the opportunity to try to influence the outcome, both by working at the level of raising consciousness and through helping draft legislation ratifying some sort of hard-fought compromise that achieves certain goals (e.g. for new common carriage or new universal service). This embodies the EFF approach.

continued on page 58



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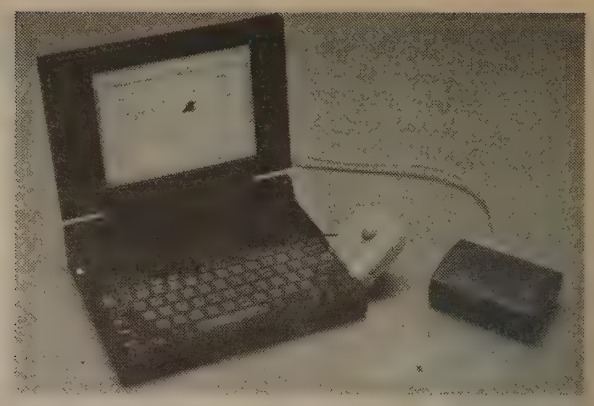

A Business Card Scanner And Database

CardGrabber Offers An Integrated Hardware And Software Solution For Managing The Business Cards And Contacts You Collect

BY ED KAHN

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In the past I have read announcements of products that will scan in and store your business cards, but these products have never made sense to me. I want the information on business cards I get integrated into my rolodex. Recently, Pacific Crest introduced a product that goes beyond anything I have previously seen. CardGrabber is a combined hardware and software solution that lets you scan in business cards and integrate the listings into a general database which can then be used for telephone management as well as an address book.

Here is how this product, which runs under Windows, works: After you scan in business cards through a small scanner measuring 3.5" x 5" x 1.5" designed specifically for this purpose, the software sorts the information into fields that you have set up in the database. The accuracy of this product is truly amazing. I tested the scanner with an assortment of business cards and, for the most part, the software was able to recognize first name, last name, business phone number, residence phone number, and fax number as well as the normal items like city, state, zip code, address, and company name.

LAPTOPS

If this was all the product did, I would hardly think it worthy of inclusion in these pages, but that is merely the beginning. The software that comes with CardGrabber creates a sophisticated database that lets you import your existing phone and address list and incorporate these new entries into the list. The software is multidimensional. It has filters and categories so you can isolate any group of names you want. For instance, you can set up "Comdex '93" as a category and later retrieve all of the entries of contacts you made at that show. Or, you could ask for a listing of all of the names in the list that carry a Los Angeles address. You could even ask for the list to sort by first name if you remember a guy named Guy whom you can't find in the list.

Another feature of the software is the ability to manage your telephone dialing from the database. The phone management capabilities are powerful. From a pull-down menu, you can select to dial from a wide range of numbers that includes all the telephone number fields you have entered into the database, including fax numbers.

CardGrabber's printing capabilities are also powerful. You can design a phone directory in pretty much any format you choose. You can also have the directory print a copy of the business card. If you have made notes on the business card, they will be included in the graphic representation of the card. Likewise, you can elect to have the flip side of the card scanned for future reference. In the initial entry of data after scanning the card, you may include whatever information you want in a comment field. This will allow you to remind yourself of anything you need to remember about this entry.

CardGrabber is a relatively large program, installing from three 1.44MB disks, partly because it must recognize a wide range of fonts to be able to make sense out of a large variety of typefaces found on business cards. In addition to its size, this program has so many capabilities it needs a powerful system. You need at least an 80386 processor, hard drive with a minimum of 5MB of free space, and at least 2MB of RAM, with 4MB recommended.

I followed the simple installation procedure, but initially had trouble getting the scanner to work. I have a lot of different devices attached to my portable computer, so I figured that perhaps some of the peripherals would have to be disconnected. The scanner connects through the parallel port.

Unlike some other devices that communicate through the parallel port and let you attach your printer in daisy chain fashion to them, this scanner requires you to unplug your printer and hook directly to the parallel port. This design feature indicates that this scanner is not intended to be installed all the time—just when you have cards to input. The software does not require that the scanner be attached except when you input data from the scanner.

In any case, after having no luck doing this myself, I phoned technical support, which I am pleased to say was prompt, courteous, and knowledgeable. They asked me to do a number of things like remove lines from my config.sys file that might cause a conflict. In the end, they concluded that my portable—an AT&T Safari that is several years old—was too old to support this device. The story I get is that virtually any computer made in 1991 or later will work, but there are a few exceptions. If you are going to buy the CardGrabber, I recommend that you be sure you can try it out before you buy or that there is a return policy. Wonderful as the product is, it is useless if your computer will not support this hardware.

This product works equally well on a portable or a desktop unit, and is small enough to travel with your portable computer when you are on the go. On the other hand, the scanner does require an AC power source. The company tells me that a battery-operated version is in the works.

If you get lots of business cards that need to have their data transferred to a database, this may be the product for you. Excellent hardware, software, and technical support make this product a winner. Pacific Crest has not set a suggested retail price, knowing that nobody ever pays those prices. They tell me that the street prices seem to vary from about $340 all the way up to $399, so check around before you lay your money down. ■

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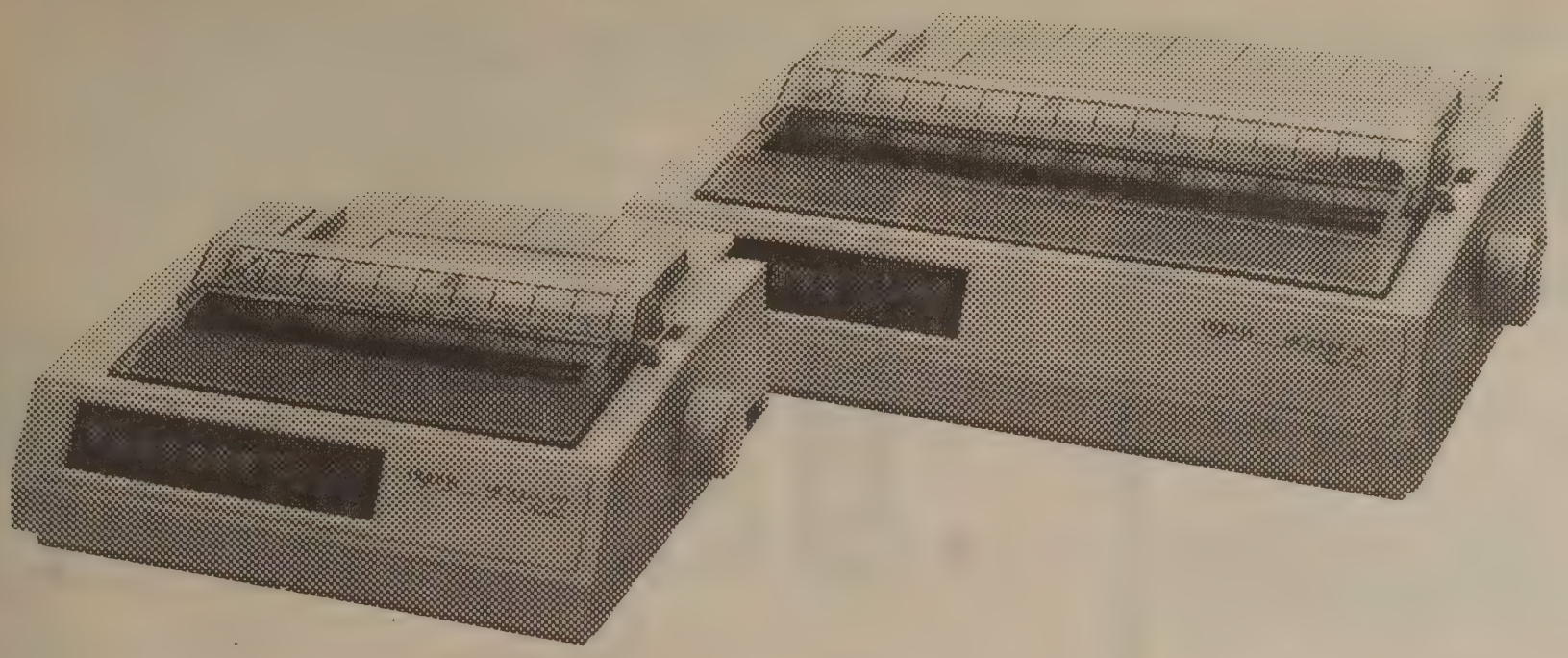

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LAPTOPS

COMPUTER OF THE MONTH:

Sharp PC-8650 Active Matrix Color

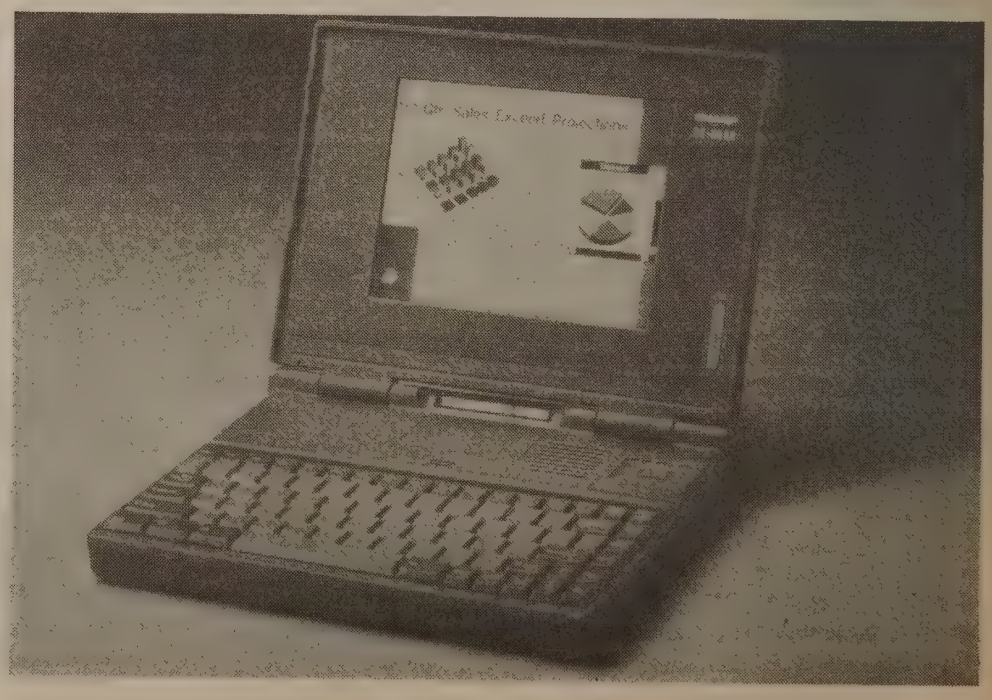
Active matrix color displays have now become almost commonplace in the portable market. This month I examine the Sharp PC-8650, which carries a retail price of $3299. This is a sleek portable with all the features you need, expansion capabilities, and a wide array of accessories.

The PC-8650 is a 486DX computer running at 33MHz. This is quite fast for a portable and comes close to what you might buy in a desktop unit. This laptop, which can run on either AC power or the included Nickel Metal Hydride battery pack, weighs only 6.4lbs. including the battery pack. Its footprint is only slightly larger than an 8.5" x 11" piece of paper, with a height of less than 2". In short, the PC-8650 will easily fit inside a briefcase. It comes standard with 4MB of RAM, expandable to either 8MB ($299) or 20MB. A 200MB hard drive and a high-density 3.5" floppy drive are standard equipment.

The active matrix color display offers a brilliantly clear image that refreshes as fast as you will need. In the early portable color displays, when you moved the mouse around, shadows were left behind and it took a little while for the screen to catch up to where you were. In this and other new displays, the problem has been eliminated. This screen measures 8.4" diagonally. It supports VGA resolution. If you connect an external monitor, you can increase the resolution up to 1024 x 768 using sixteen colors. You are also able to use both the internal display and an external monitor simultaneously.

The keyboard is well designed and has a good feel. I had no trouble typing on this machine. I am pleased to see that so many of the new portables now come with a keyboard design pioneered by Toshiba and others that place the keys where most users want them. Not long ago, companies tried to be innovative rather than adopting the design that users preferred.

This computer, like most of the new models introduced these days, is designed to run Windows. Sharp includes a trackball that attaches to the front of the machine. While this pointing device is certainly satisfactory while on the go, it simply doesn't do the job of a conventional mouse. Sharp, realizing this, has made provisions for users to attach a conventional mouse through the same port that an external keyboard uses. In order to use both an external keyboard and mouse, you will have to buy the keyboard/mouse adapter ($25). This device splits the port into



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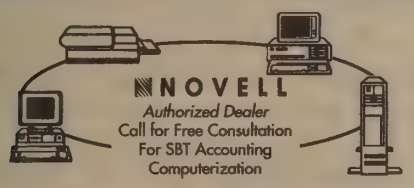

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two ports, one designed for the mouse and the other for the keyboard. This is a good arrangement as some computers make you choose between an external keyboard and an external mouse. If you use the machine in a single location much of the time, you will want to buy this gadget and get both a mouse and keyboard of your choice.

The power management software provided by Sharp allows you to conserve power and get up to about two hours of use out of a battery charge. Additional battery packs ($175) are available. The included AC adapter will charge the battery pack in about two hours. This is a reasonable amount of time. While some machines take considerably longer to charge a battery than it takes to drain it, Sharp is on the good end of the spectrum.

A single serial and parallel port are provided on the back of the unit. Although one serial port often seems like not quite enough, on this machine it is adequate. First, the ability to plug in a mouse to the keyboard port removes one of the major uses of a parallel port. Secondly, a PCMCIA Type II slot is included. This slot can take a wide range of peripherals including network adapters, fax/modems, and memory cards. Third, Sharp offers a 14,400bps internal fax/modem ($425). The result is that you can use a wide variety of external devices and the serial port will still be available.

More and more users are buying portables as their only computer these days. In the office, they use an external monitor, keyboard, and mouse, and when they are on the go, they disconnect everything and hit the road. When they return to the number one location, they have to reconnect everything. Sharp has addressed this problem by offering a port replicator ($149). This device plugs into a 200-pin expansion port and replicates all of the ports found on the back of the machine. This means that when you are ready to leave, you simply unplug one cable and the job is done. On returning, simply plug in the cable and you are back in business.

A one-year warranty covers this machine. Sharp's technical support line answered my call promptly and was able to answer the questions I had. If you are ready to move up to color on your portable, have a look at the Sharp PC-8650. ■

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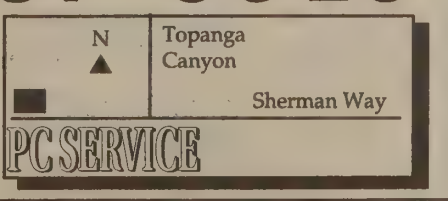

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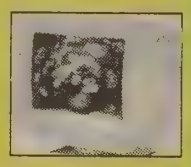

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Los Angeles Reacts To The Earthquake

New Telecommuting Opportunities To Help Relieve The Strain On LA's Damaged Freeway System

BY ROBERT MOSKOWITZ

At 4:31 am, on January 17, 1994, southern California woke up to a 6.7 earthquake that—aside from its destructive and killing power—has led to a grand experiment in practical telecommuting.

Almost immediately, telecommuting experts, in-house telecommuting coordinators, and government telecommuting planners began looking for opportunities to expand the use of telecommuting to take some of the strain off LA's heavily damaged freeway system.

Telecommuting Partnership, which quickly cobbled together a proposal to Ron Brown, US Secretary of Commerce, who within days provided funding in the amount of $1.5 million through the National Telecommunications and Information Administration! This was supplemented with another $1 million scraped together by CALTRANS from existing programs related to telecommuting, most of which have been discussed in this space before. There is also some $3 million pouring in from FEMA, earmarked mostly for transportation demand management, a portion of which may be allocated toward telecommuting expansion. The Telecommuting Partnership includes the City and County of Los Angeles, CALTRANS, GTE and Pacific Bell, The RAND Corporation, and the Center for the New West.

Under Herman's direction, the Partnership is scrambling to open some of the following as rapidly as possible:

• New telecommuting centers in areas relatively isolated by the earthquake, including Antelope Valley, Northridge, Santa Clarita, Sylmar, Valencia, Santa Monica, South Central Los Angeles, East Los Angeles, and West Los Angeles (convenient east-west travel in the Los Angeles Basin has been virtually eliminated by the destruction of three overpasses along the Santa Monica Freeway, Route 10).

• Systems to encourage and support telecommuting from home by workers who normally commute over the region's disabled web of freeways. This includes an 800-number hotline (1-800-6-INFOHighWay [1-800-646-3649]), which is intended to be a clearinghouse of telecommuting resource information, complete with "help desk" resources to get new telecommuters operational with computers, networks, modems, and the like.

• Other programs to be attempted include: neighborhood telecommuting training seminars, a computerized database of information and referrals to technical information on hardware and software, creation of telecommuting information and educational materials, and contacts with employers to encourage the proliferation of telecommuting.

> "The assumption that, because the **earthquake** has **disrupted the freeways**, employers will change their long-running **objections to telecommuting** is a very weak one."
>
> *—Wally Siembab, Director, Telecommunications for Clean Air*

At HealthNet, for example, Karen Carrol noticed that dozens of the claims processors who worked for her commuted from the other side of the freeway bridges knocked down between LA and the Santa Clarita Valley. At her instigation, HealthNet expanded its presence at the telecommuting center in Lancaster and began making plans to open its own satellite center in Valencia—eliminating commutes for about one hundred employees. Other companies began filling up spaces in previously underutilized telecommuting centers in Valencia, Santa Clarita, and Antelope Valley. In fact, California State University at Northridge, which took a pretty bad beating from the quake, set up telecommuting facilities in some of its empty dorm rooms.

Susan Herman, manager of the City's telecommunications department, began making plans to convert some fifteen thousand city employees into telecommuters. And she formed a group called The

THE REALITY CHECK

While all this sounds commendable, other experts in the LA community feel there may be more sound and fury in this program than actual progress toward bringing employees into the world of telecommuting.

Wally Siembab, a telecommunications expert who is director of the Telecommunications for Clean Air project, the nation's only telecommuter "facilities exchange" program, feels very sad that certain advocates of telecommuting came racing into the post-earthquake LA situation with all these resources and with assumptions about telecommuting that just have not been realized.

But the handwriting was on the wall from the very beginning. At Transportation Management Administration meetings, for example, large employers in the LA region devoted considerable energy to discussing rail and bus transit plans to help move their

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workers from home to job. When telecommuting was raised as a possible alternative, these employers gave lip service only, claiming that top management doesn't like it, or that they already had about as many telecommuters as they were likely to get. One representative even admitted that his company likes to see people working in the office, not at home.

In addition, the bulk of the interest in new satellite-center telecommuting capacity came from a few employers who were already heavy users of the existing telecommuting satellite-centers, including GTE, PacBell, and HealthNet.

"The assumption that, because the earthquake has disrupted the freeways, employers will change their long-running objections to telecommuting is a very weak one," Siembab asserts. "I'd like to see some proof there is a demand for it, and right now no one can offer that proof."

The bottom line is that within the first three weeks after the earthquake, only a relatively few new telecommuters were added, that the 800 number Telecommuting Information Clearinghouse is ringing only infrequently, and that very little of the money appears headed toward cost-effective programs and facilities that will be well planned and heavily supported in the long run.

Siembab may be unnecessarily gloomy about the Partnership's prospects, but his ideas are supported by what actually happened in a similar situation after the Loma Prieta earthquake near San Francisco. When the Oakland Bay Bridge went down, there was a high level of activity to bring more telecommuters online. But as soon as the bridge opened up again, virtually all of these telecommuters went back to their cars.

"I'm very hopeful," says Siembab, "that this earthquake will be the stimulus needed to increase the rate at which telecommuting is adopted by significant numbers of employers and their employees. However, I believe we should proceed a little more cautiously than we seem to be doing."

As the evidence rolls in—one way or the other—over the next few months and years, you'll hear about it, as well as about its lessons and its implications, right here in this space.

SOME MODEST SUGGESTIONS

Regardless of how successful the Telecommuting Partnership's program may turn out to be, there is some very innovative thinking going on in some parts of the earthquake damaged region. An article in the *Los Angeles Times* by Michael Schrage, part of his ongoing series on Innovation, ran just ten days after the 6.7 earthquake. After chiding the local and state administrations for a lack of planning to make use of telecommuting options so profound it seemed based on assumptions that "commuters would get up at 4:30 in the morning so they could all get to work by 9," Schrage proposes that government:

- "Identify the fifteen or twenty companies that generate the most traffic," and encourage them to support many of their employees as telecommuters one or two days a week.
- Enact compulsory telecommuting for certain groups of workers.
- Compel PacBell and GTE to cut local daytime phone rates by 50–75% in areas impacted by the earthquake, and also to help large employers offer voice mail and call-forwarding more easily and cheaply to telecommuters at home.
- Slap "a special surtax...on mobile cellular phone calls to discourage driving. Calls that remain within a single cell would merit discounts."

Whether or not you agree with any of these suggestions, it's clear that a good many laws, regulations, and market incentives can be recast in the aftermath of the earthquake to provide stronger reasons for employers to support telecommuting and for

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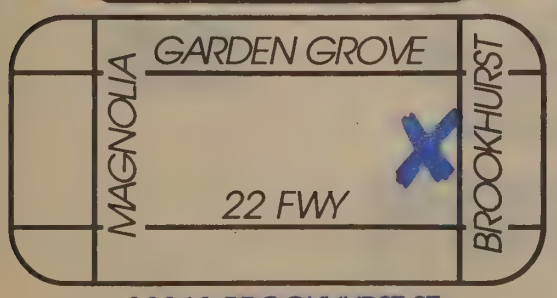

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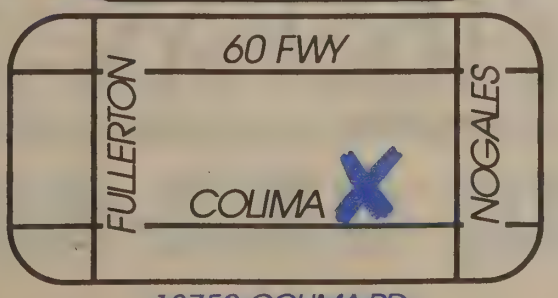

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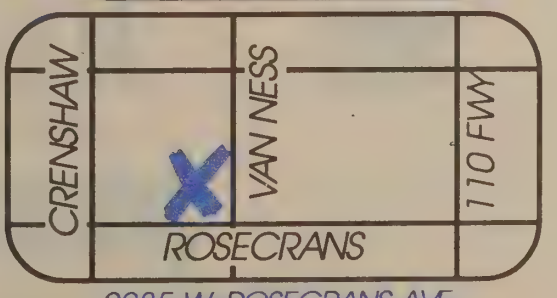

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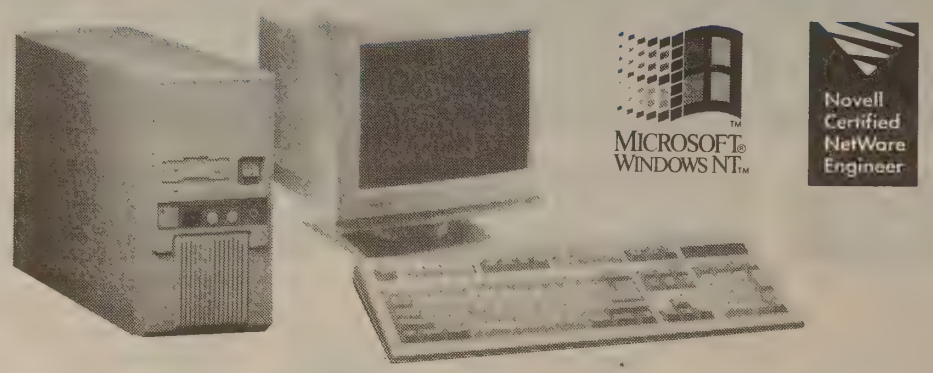

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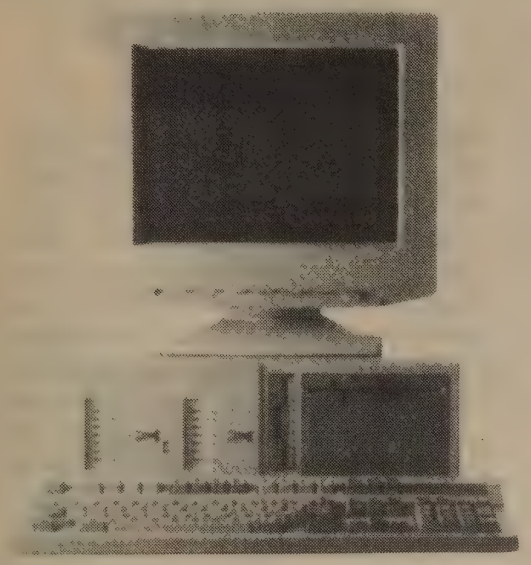

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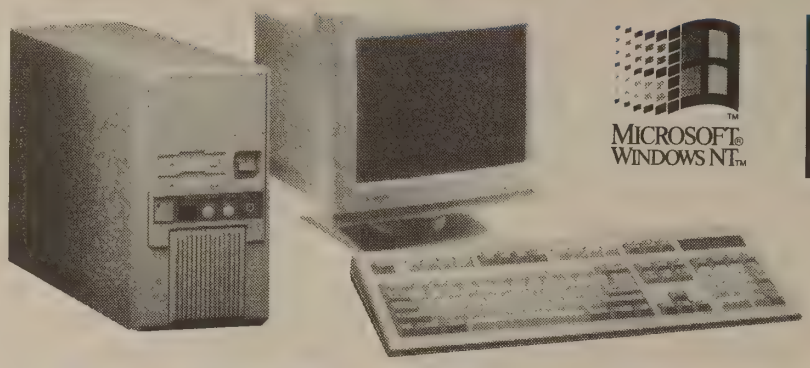

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employees to try it. Right now, the LA region has much more excess capacity on its information highways than on its heavily damaged concrete highways.

Readers with reactions to any of these ideas, or ideas of their own, can send them to me by fax at (818)224-4343, or by electronic mail at Robertam@netcom.com.

LOCAL GOVERNMENT ONLINE

Before the quake, this article was to have been about the trend of local governments—most notably in California—to put their functions and services online. These governments seem motivated partly to improve service to constituents, partly to save money, and partly to promote the concepts and advantages of telecommuting. Unfortunately, the earthquake has shaken up some editorial priorities, and we won't have room for a full discussion of this important new trend this month. Instead, we'll cover as much as we can now, and pick up the rest later on.

Half a dozen cities and regions have already experimented with some form of online system. Oakland has its Information Access. Cupertino has its SmartValley Project (throughout the Silicon Valley). Pasadena has its PAL Public Library system (read-only and available for franchise/replication).

One of the best-known is Santa Monica's PEN system, which provides a bulletin board and email system, conferencing, and public terminals. Available through the city's information systems department, PEN is open to anyone who lives or works in Santa Monica, and who has a computer and a modem with which to dial in and become a member. Diamond Bar is another California city with a dial-up access online system. The state of Hawaii has one, and Japan has a network in Coara, in the Oiata prefecture on one of that nation's southern islands.

But the most exciting system so far can be found in Glendale. Called LNX, the Local Information Utility, it will probably be operational by the time you read this.

Ruth Thompson is the LNX project director. It was her background in libraries that led her to develop this broad, innovative notion of how information ought to be provided. Although the existence of LNX is testimony to her practical nature, she's very much an idealist about what can be done in this area.

The LNX system is designed to provide information that people are looking for every day to help them go about their business. Because nearly everyone's time is increasingly overcommitted, the LNX system is conceived as a way for citizens of Glendale, and others, to accomplish more in less time, even on short notice.

Thompson sees LNX not only as an efficient method for providing information, but also as a tool for bringing local government into closer contact with its constituents. She even hopes it will be a tool for easing the trend toward disillusionment and alienation from the local community and the neighborhood, a method of promoting a sense of belonging, akin to the feeling that once came with knowing the shopkeepers in your local area.

To this end, LNX contains specialized information that many people don't even know exists, as well as information that would otherwise have to be expensively duplicated and distributed. Unlike most systems, it includes both governmental and commercial information.

"City Council holds its meetings in the middle of the day," says Thompson, "so most people can't come. But they still need to interact, and to feel their opinions matter. LNX makes this not only possible, but practical."

Through LNX, citizens of Glendale can more easily learn about what's going on politically, can send notes to their representatives, and can hold electronic conversations with those who make deci-

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sions, or send a message to the maintenance department to have their streetlight fixed. Because the system is conceived as a "peer to peer" network, users can also conference with friends. Because it has commercial as well as governmental information, LNX users can send messages to local store owners, publicize local events, reserve tickets, make reservations at restaurants, and (eventually) even see what the restaurant looks like through a video hookup.

LNX is going to be cost-effective for Glendale because, like most cities, it is trying to serve larger and larger populations with smaller and smaller staffs. Being able to post information and get instant messages at lower cost, and to get people served without having them sit on "hold" for a long time is a major advantage. In addition, it's better for city workers charged with answering public phones to get messages electronically and be able to conduct business more quickly. "They won't feel pressured beyond their ability to cope," says Thompson, "because they'll know fewer people, if any, are on hold waiting for their turn."

LNX was conceived from the beginning as an interactive information resource that should go into every home just the way water and power do. The system actually began with a gateway to the public library catalog. Within a year, Glendale College will connect to LNX with its online catalog, and also with its class registration system.

"We thought from the beginning that we needed public computers for those who don't own them," explains Thompson. "So we have installed computer kiosks in public buildings. They're not standalone systems like most kiosks, but are connected with the entire LNX system and can be used interactively with anyone else on the system."

Most of the LNX system requires dial-in by those who are familiar with computers. But the public kiosks are carefully designed with a touch screen to simplify the interface and reduce the fear of those who aren't familiar with computers. They use sound, music, and graphics to ease new users into how to operate a computer to find out what you want. Dial-up access is through DOS, Mac, Windows, and Terminal Emulation.

There are also features to support telecommuting, such as electronic mail and conferencing, which Thompson expects to be used by city employees as an alternative way of conducting business. Technologically LNX provides the capability for city employees to telecommute to work, and Glendale has empowered city division heads to approve telecommuting for their employees. Already, the Glendale Unified School District is looking at ways to use LNX as a wide area network for conducting a lot of their meetings, and LNX will effectively put the entire Glendale government online.

Future developments will include an electronic banking and bill-paying capability, which Thompson sees as a critical step on LNX, because it will allow people to complete a transaction online. That is, they can select an item through the electronic yellow pages and actually purchase it online, pay for utility bills, register for a class and pay for it, connect to the city's registration/permit department and pay any amount due, and so forth.

There's a great deal more, of course, which we don't have room for this time. For more information, you can contact Ruth Thompson directly at Glendale LNX, (818)548-6459. ■

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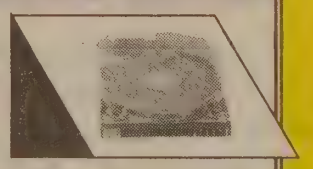

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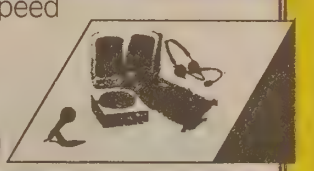

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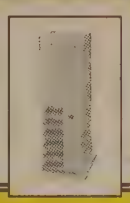

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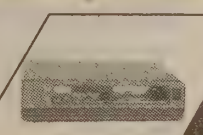

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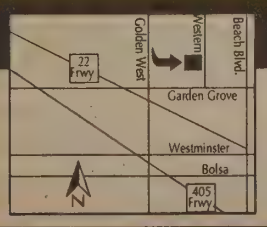

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The final 1099s landing in our mailboxes confirm that tax season is underway. For those wishing to be prompt in their worrying, this article reviews changes in the 1993 tax laws likely to affect programmers, contract engineers, software developers, and technical writers.

The potluck banquet of '93 tax modifications offers something for everyone—you'll especially want to be aware of the following news and reminders as you prepare your income tax returns and plan your strategy for next year.

QUALIFIED R&D EXPENDITURES

At the top of the list are recent proposed regulations defining what qualifies as research and experimental expenditures. Expenditures that qualify are treated favorably in that they can be currently deducted in the year incurred—even before the resulting product is brought to market. Also, expenditures meeting the definitional test of research and experimental expenditures may qualify for the valuable R&D tax credit.

In ancient times, the IRS would allow taxpayers to treat software development costs in a manner similar to that in which research or experimental expenditures were treated, which was good. But, ten years ago, a hungry government proposed regulations that would have imposed a host of additional conditions for the qualification of software development costs, even beyond those applicable to other products. Those bad news conditions served as guidance in related tax situations until recently.

New proposed regulations, issued last March, should be a boon to software developers. They reaffirm a favorable position from the good old days, removing major barriers that restricted many small fry from realizing important tax benefits. These rules, and their effect on software developers, are explained in a July 1993 *MicroTimes* article, reprints of which are available from my office.

BUSINESS EXPENSES

One happy taxpayer won a case last year that is bound to be good for a nickel or dime this spring. In *Cox v. Commissioner*, a husband claimed a Schedule C business deduction for one-half of the rent that he paid to himself and his spouse as joint owners of a building in which his business was located. The IRS had argued, unsuccessfully, that rent deduction was allowed only if the spouses file separate returns.

For programmers and other independent contractors seeking to reduce their self-employment taxes, this case suggests several possibilities for income shifting between spouses. For example, one spouse might rent an office in the home to the other spouse. Several traps await the unwary, however, so check with your tax adviser before trying anything bold or adventurous—that's the bean counter's department.

Should your innovative strategy fail, the Tax Court recently held that legal expenses paid to fight an IRS deficiency assessment are deductible as a business expense (rather than as an itemized deduction) if the tax issues involved relate to Schedule C deductions. Therefore, even if you're a sole practitioner, the cost of your tax defense can reduce not only your income taxes but self-employment taxes, as well.

EMPLOYEE BUSINESS EXPENSES

Congratulations to Judy Dunkelberger for making Silicon Valley tax headlines.

Dunkelberger is a CAD manager for Advanced Micro Devices, Inc. AMD, having drained its piggies defending its honor against patent claims brought by Intel, apparently felt they couldn't spare the change to reimburse Dunkelberger for costs of meals, parties, doughnuts, candy, and flowers that she purchased to boost the morale of employees under her supervision. The IRS wasn't all that generous either, disallowing among other things $112.12 she spent on flowers for an ailing employee. Dunkelberger sued Uncle Sam over those flowers.

The Tax Court allowed Dunkelberger to deduct the unreimbursed costs of business meals with vendors because she was expected to incur such costs as part of her job. But, while acknowledging "the often stressful business setting at AMD," the Court found that expenses such as flowers and internally consumed doughnuts didn't score a deduction because they weren't required as a condition of her employment. Moral of story: Better to work for Intel. In any event, AMD clearly needs the doughnut money to fund development of new microcode.

SMALL BUSINESS LOSSES

A common situation among freshly incorporated hi-tech start-ups is that they lose money. Suppose a software developer (or anyone else) decides to incorporate or to buy into a new corporation that loses money. A special rule (I.R.C. Sec. 1244) permits individuals to deduct certain stock losses as an ordinary loss, rather than as a capital loss. (The ability to deduct capital losses is severely restricted.)

But if you're a holder of such shares, watch out. In a low-down miserable blow, one taxpayer was denied this favorable treatment because, even though all the other requirements were met, he failed to attach a statement to his return setting

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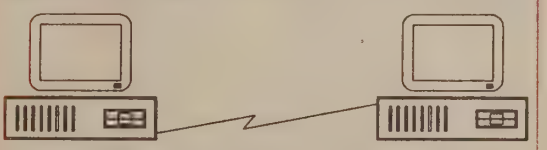

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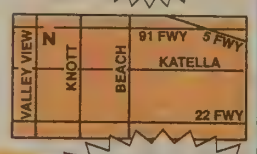

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OFFICE IN THE HOME: THE SOLIMAN TEST

The US Supreme Court hates hearing even the most important tax cases, and I doubt it will decide another one involving the deductibility of an office in the home before polar bears breed at the Florida Keys. Unfortunately, the damning 1993 decision in *Commissioner v. Soliman* will likely be the defining case for about that long.

The Court ruled that Soliman, an anesthesiologist, was not entitled to deduct the expenses of his in-home office, because it failed to meet the requirement of being his "principal place of business." Soliman saw patients in hospitals but otherwise conducted his practice at home. Despite the comparatively little time spent at each hospital, the Court considered them, not the home, to be the principal places of business, since that's where services were actually delivered.

The implications are especially great for the many technology professionals working out of their homes, because special restrictions, known as listed property rules, apply to computers. These rules state that a computer is listed property unless it is used at a regular business establishment (which may include an office in the home). Listed property cannot be expensed in the year of purchase, nor may an accelerated depreciation method be used for it. The availability of rapid write-offs may thus depend upon whether or not a home office meets the strict IRS definition as such.

But don't believe those rumors flying around about home office deductions being history. Although Soliman clearly represents a victory for the government, my bet is that software engineers, developers, and programmers are among the few groups in a position to escape the wrath of Soliman, because, arguably, the place that these folks provide their services is wherever the monitor and keyboard is situated—i.e., where the programs are written.

The Soliman decision still makes home offices potentially easy prey for IRS auditors. To protect your deduction, you should review and perhaps modify any contracts on which you're working, and document your contractual understandings as to comparative importance of the functions performed at each location.

TRAVEL FROM HOME OFFICES

Whether or not an office in the home qualifies as such might also determine if the costs of traveling from the home office to other regular business locations are deductible as business travel, or are nondeductible commuting expenses. Application of the new Soliman standard on this issue is now being tested by lumberjacks, with obvious ramifications on other hackers.

In the Walker case, a lumberjack's home office flunked the Soliman test. The IRS argued that the lumberjack could therefore not treat the costs of traveling from his home to his wood-chopping site as business travel. They lost. The Tax Court found Walker's home office to be a "regular" place of business (though not the principal one) and the cost of his travel was therefore deductible.

This case suggests that if you do programming or tech writing in your home, you can deduct mileage for business-related trips, even if your home office isn't deductible.

There's an additional benefit tucked in there for those owning, rather than renting, their home. When you claim a deduction for an office in the home, a portion of the home is converted from a personal residence into business property. The converted portion is then ineligible for special tax benefits conferred on your residence, such as tax-free rollover of gain into a replacement residence or the once-in-a-lifetime exclusion of gains on sale of a principal residence. Under this new standard, you can now take a deduction for travel from your in-home place of business without electing to claim an office in the home.

Should your innovative strategy fail, the Tax Court recently held that legal expenses paid to fight an IRS deficiency assessment are deductible as a business expense (rather than as an itemized deduction) if the tax issues involved relate to Schedule C deductions.

COMPUTER EQUIPMENT EXPENSES AND SECTION 179

A deduction is provided for those electing to treat the cost of certain business property, including computer hardware, as an expense rather than a capital expenditure, which must be depreciated over several years. The 1993 Tax Act retroactively

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increased the limit of property qualifying for this election, called Section 179 property, from $10,000 to $17,500. So you can now buy mice for everyone without exceeding the eligibility limitation.

For computer equipment to qualify for the expensing election, it cannot be "listed property." To avoid this notorious classification, the computer or peripheral equipment must be used exclusively at a regular business establishment and owned or leased by the person operating such establishment. An office in the home that passes muster under the Soliman test will do the trick.

If you are an employee, however, the office in the home must be maintained for the employer's convenience and required as a condition of employment. If you'd like more information about this, please refer to my article on "Deducting Your Home Computer," in the June 1993 *MicroTimes*.

PERSONAL HOLDING COMPANY TAX

If your corporation derives income from software sales, the income is ordinarily taxed as royalty income. A special penalty tax is designed to catch the so-called "incorporated pocketbook"—an investor trying to avoid individual income taxes by sheltering investments in a corporation. Under the 1993 Tax Act, the rate of this penalty tax, which must be paid in addition to the regular income tax, was increased to 39.6%.

Royalty payments are not subject to this penalty tax if they meet a safe harbor test for being "active computer business software royalties" (See *MicroTimes*, September 1993, "Developers and Programmers—To Incorporate or Not"). With the stiff penalty increase, it pays to double-check your computations to make sure this safe harbor is met.

SOFTWARE DEPRECIATION

Congress finally realized that a five-year depreciation life for "off-the-shelf" software is excessive, so they shortened it. Under the 1993 Tax Act, software bought after May 10, 1993 is depreciable at a fixed rate over a period of thirty-six months rather than sixty. Your program is now a little less likely to become obsolete faster than you can depreciate it.

This doesn't apply to all software. The software must still be an allowable business write-off. There's also an esoteric exception if the software was acquired in a transaction involving the acquisition of assets constituting a trade or business, in which case the depreciation life is extended to fifteen years.

Armed and forewarned with these facts, readers can now move forward into the tax season with pride and confidence that our government has not overlooked the special needs of high-tech professionals. As a consolation gift, you may also wish to arm yourself with a complimentary 1993 tax organizer, by calling my office at (510)893-5753. ■

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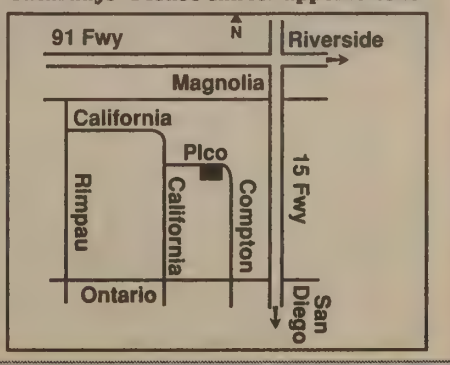

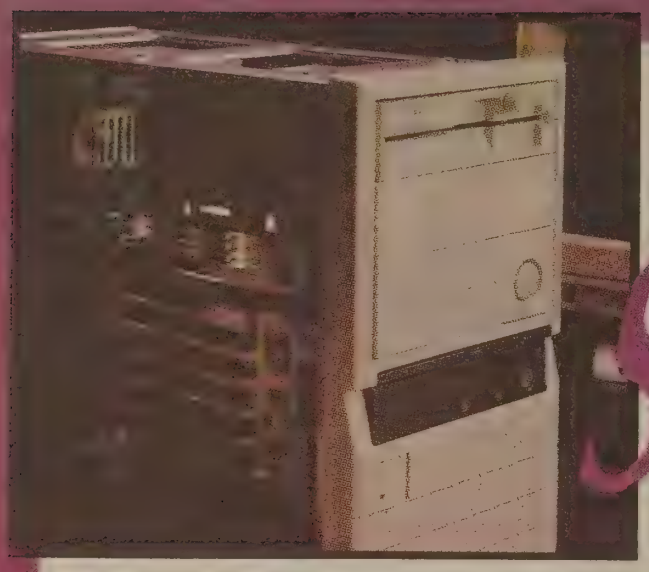

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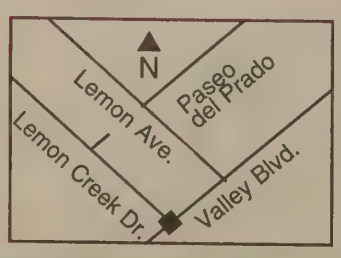

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In addition to seeing the latest products and multimedia effects, and getting high-quality information from a host of speakers and panelists, attendees will be contributing to LA's recovery from recent natural disasters—the event includes several charity functions.

Partial List Of Exhibitors

Apple Computer
Borland
Brøderbund
Compton's NewMedia
Egghead
IBM
Logitech
Lotus
Microsoft
Skytel
Traveling Software
WordPerfect

Selected Panels And Seminars

The BBS as a Profit Center
Energy Star Computers: Making Cents for Your Organization
Personal Video Production
OS/2 Overview
CD Authoring
Common Misconceptions of Buying Your First Computer
PCMCIA and the Consumer
Upgrading to Multimedia
The Future of Pen Computing and How You Can Increase Your Business Using the Latest Technology
An Overview of Educational CD-ROM Titles
Launching Your Home Business
WordPerfect Overview
Using the Internet
Almost All About Software
Software for Users on the Go
PCs Today and Tomorrow: From Basic Productivity to Cruising the Digital Highway
Photo-Morphing
The Shrinking PC—Laptops and SubNotebook Trends

Keynote Speakers

Jerry Pournelle—Senior Contributing Editor, *BYTE* Magazine
Larry Magid—Syndicated Columnist, *L.A. Times, Washington Post*
Dave Horowitz—Syndicated Columnist

Speakers

Jeffrey Armstrong, Saint $ilicon
Al Shugard, President & CEO, Shugard Industries
Mark Pontius, Director of Marketing, Cardinal Technologies
Larry Van Cantfort, Compton's NewMedia
Linda Latham, Program Manager, Environmental Protection Agency, Energy Star Program
Jim Glover, IBM, PC Products Division
Michael Goldstein, EIC, *PC Laptop* Magazine
Betty Sheets, PowerLink
Mark Eppley, Chairman & CEO, Traveling Software
John Crowder, WordPerfect
Jud Alford, NewTek
David Jung, ARCO Products
Wayne Yacco, Contributing Editor, *MicroTimes, PC Laptop, PEN Computing*
Carey C. Harwin, President, InfoLink
Kenneth Taira & James Lummel—Topic: Using the Internet
Steve Bass, President, Pasadena IBM Users Group (PIBMUG)
Russell Glitman, Executive Editor, *PC World*
Mark Brownstein, Former LA Bureau Chief, *InfoWorld*
Jim Brunjes, Educator
Dan Day, Director, Mt. Sierra College, Novell training site
J.C. Coldren, Instructor, New Horizons Computer Training Center
Scott Page, 7th Level
Tony Hatch, Walt Disney
David Mastrandrea, LA VAUNAGE Calvisson
Arnie Lapinig, CypherTech
Dr. Raymond J. Bambery, JPL
Michael H. Campbell, President, Campbell Software

After The Quake

Hard-Hit But Upbeat, The Valley Gets Back To Work

Greg Gooden, sysop of The Annex BBS, lives one mile from the epicenter of the Northridge quake, which he describes as "definitely an E-ticket attraction." More fortunate than many, Gooden reports that although the house from which the BBS was run was damaged considerably, the board is up and running.

In the days after the quake, he found that the physical damage had less effect on his board's traffic than the sheer absence of his users, over 20% of whom haven't been able to log in since the quake. The board, says Gooden, represents a very tightly knit social network, and the disaster had been a true bonding experience, with callers reporting in and verifying the well-being of other members.

With characteristic resilience, computer users and merchants shaken by the events of January 17 and the subsequent aftershocks are already well on the way to rebuilding. Most are open for business, although Alcom Systems in Van Nuys (818/989-9182) was forced to relocate and the Northridge branch of Better Domain was closed due to damage (call the South El Monte store at 818/443-3492 for updates).

Almost all the local merchants we talked with reported some amount of damage, particularly broken windows and monitors. Currently sales of new systems seemed to be down, perhaps as would-be customers awaited replacement checks from their insurance companies. Or maybe it's the aftershocks—reports Bijan Chadorchi of Americal in Sherman Oaks, "people seem scared to buy systems right now." On the other hand, several report that the service and repair business is booming as customers bring in quake-damaged equipment.

For many businesses, the worst effects of the quake came not from damaged premises and destroyed equipment but from its ramifications in the surrounding community infrastructure. Americal's Chadorchi reports that walk-in business at the damaged Sherman Oaks location has dropped off considerably as the nearby residents leave their homes, many of which were destroyed. Also in Sherman Oaks, Peter Brunner of the Electric Music Box reports that he was without electricity for two days, but compared to nearby businesses that were completely destroyed, he feels lucky.

Similarly, some merchants report difficulties as a result of losing phone service—Mike Stewart of C-MOS Solutions in Calabasas says that while his local telephone service was restored in a day, his 800 number, on which his national mail-order business is very dependent, didn't come back up for a week. He also happened to be filling out FEMA paperwork when we called and described the experience as "a nightmare in itself."

While hard hit, all the merchants we talked to were optimistic about long-term recovery prospects. However, in LA's year of disasters, they all agree that they're facing an unusual number of challenges.

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continued from page 28

BELL ATLANTIC/TCI AND BEYOND

We may all get lucky in the sense that the architecture of consumer broadband networks winds up following a model that resembles the Internet in its openness and decentralization. This appears to be the general direction Bell Atlantic is taking. However, while their system is open (in terms of common carriage or system architecture), it is heavily asymmetrical, with a big downstream pipe and a small upstream pipe, at least for the foreseeable future.

If the TCI merger goes through, and if they are able to rationalize two different networks, business models, and corporate cultures, what obtains for BA will hold for TCI too. There are some mighty big ifs here, and in any event Bell Atlantic/TCI only serves 25% of the country. Other carriers, who have a different business model that does not emphasize revenue from transport, *a la* Bell Atlantic, but revenue from content, may choose to go with closed, channelized systems.

> As a pragmatist I believe that government action, or certainly the threat of it, may be useful or, in the worst case, necessary, to achieve the desired end.

We have to see what other cable companies and telcos actually offer. The pragmatic question that faces us will be what, if anything, can be done to nudge the system into providing alternatives closer to open platforms.

All in all, I'd prefer to try to catalyze any necessary changes in mindset of carriers in order to secure voluntary moves. But as a pragmatist I believe that government action, or certainly the threat of it, may be useful or, in the worst case, necessary, to achieve the desired end. Further, since the whole process is already highly politicized, I think involvement to prevent bad governmental solutions from being imposed and screwing things up is clearly necessary. Thus politics is inevitably involved to carry out an anti-authoritarian mission. At least in my view. ■

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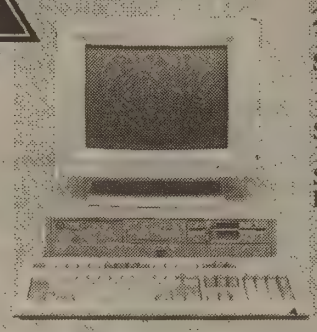

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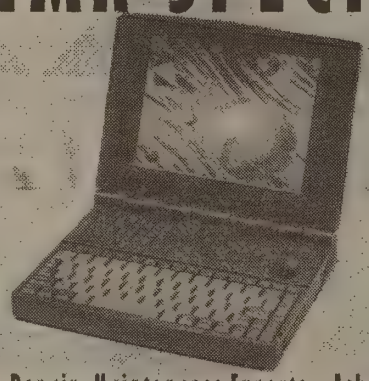

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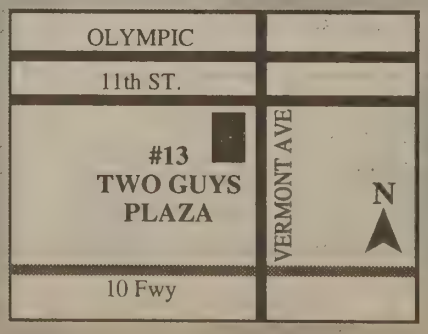

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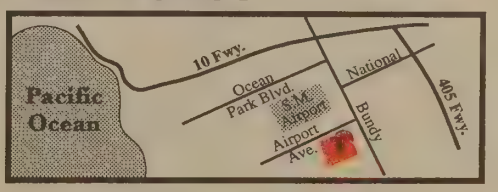

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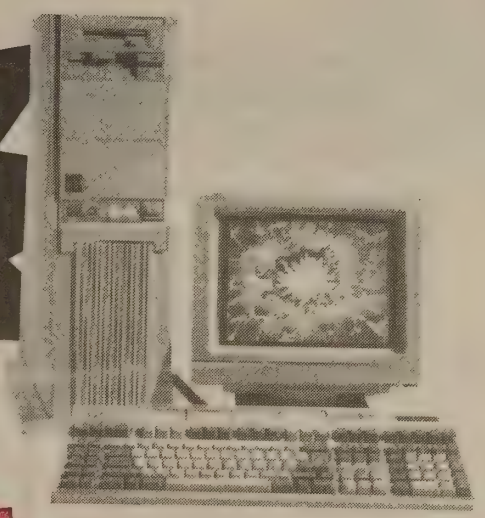

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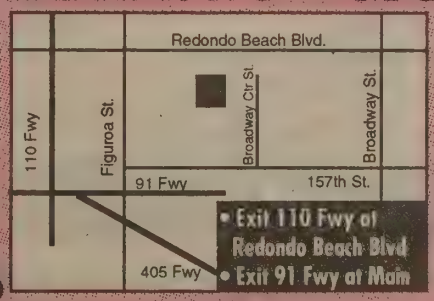

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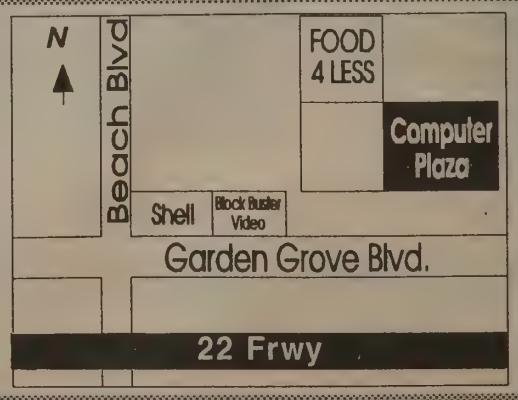

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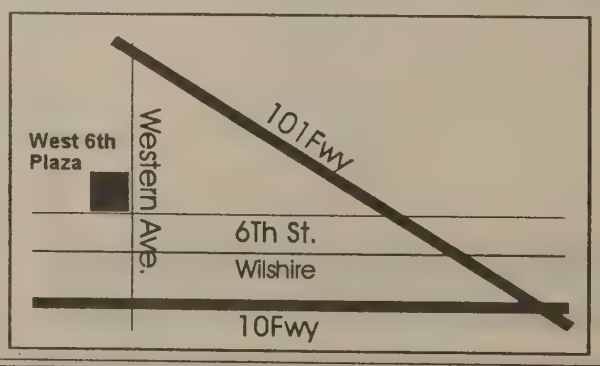

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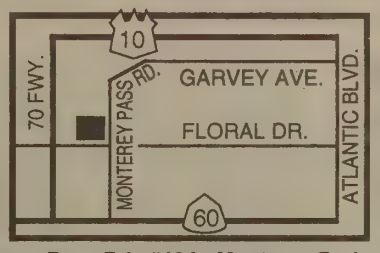

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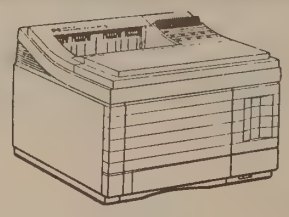

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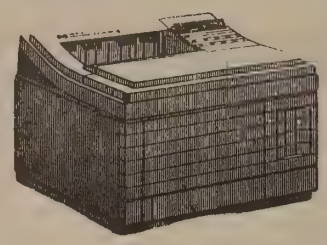

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- 255MB Hard Disk
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continued from page 22

HACKERS HATED 'EM; LAWYERS LOVED 'EM

At the hearings, one quickly became able to predict what almost every speaker would say—just by their *appearance* as they approached the podium:

If they were somewhat rumpled, or informally dressed, much less sporting a beard or unkempt hair, they would identify themselves as programmers or technically competent CEOs of companies—and speak against software patents of any kind. (There were few exceptions.) Many of them outlined specific nightmares. Many tried to explain the crucial programming techniques and sharing that made software "the fastest growing industry in the United States, with 1992 sales...accounting for over $36.7 billion of our domestic gross product" [from the PTO hearings announcement]. The PTO officials listened, politely.

If speakers appeared to spend more money on their coiffures and three-piece suits than they spent on computers, they would identify themselves as intellectual-property attorneys and allow as how software patents were just dandy and should even be strengthened. (I didn't notice *any* exceptions.)

One of the speakers near the end of the second day pointed out that almost all of the technologists who had spoken were opposing software patents. Lehman said that there were a few exceptions, but said that the fact had not been lost on him and his staff. Apparently however, noted and ignored.

Lehman was clearly attentive, clearly concerned, and has a reputation for being willing to challenge the status quo—at least a little bit. At one point however, he *did* make it a point to say that he certainly didn't want to upset the five thousand PTO employees and their families. (*Hey!*, first things first.)

But it seemed clear that Lehman was totally rejecting the almost-universal anti-patent pleas of those programmers and technologists who were *promoting* progress, innovation, and productivity, in favor of the lawyers' elephant-swallowing rationales for software patents.

Okay—administrative appeals are exhausted. But this ain't finished, folks! See next month's column.

OR, MORE BRIEFLY...

Autodesk is reportedly the sixth-largest PC software publisher in the world, but nonetheless is vehemently opposed to software patents. (Full disclosure: I'm an outside member of its board of directors.)

Autodesk's programmer-founder, John Walker, put the software-patent issue most succinctly: "Should winners be chosen by customers, or courts?"

THE HORSE'S MOUTH

Jim Warren will speak about "Electronic Public Access to Government" before the Commonwealth Club in San Francisco, May 5th at 5 p.m. (415/597-6700). ■

Warren founded InfoWorld, *Wireless Digital, Initiative, Inc., and one of the nation's largest public microcomputer conventions. He was founding host of PBS's* Computer Chronicles, *founding editor of* Dr. Dobb's Journal, *and has chaired various trade and professionals' organizations. He holds graduate degrees in computing (Stanford), medical information science (UC Medical Center), and mathematics & statistics. He has been a computer professional since 1968, and was a mathematics teacher and professor for ten years before that.*

He organized and chaired the landmark First Conference on Computers, Freedom & Privacy (1991), was one of the first to receive the Electronic Frontier Foundation Pioneer Award (1992), led the recent successful effort to make state legislation and statutes available via the public nets without state charge, and is now pushing for computerized state and local political disclosures. He is also a member of Autodesk's board of directors.

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Examples of Idiotic Software Patents

In his opening remarks at the January 26–27 San Jose hearings on software patents, Patent and Trademark Commissioner Bruce Lehman said of his computer systems and applications examining group, "We use stringent hiring standards to ensure that our examiners come in with the proper background, and then provide training from experts in the field to ensure that they keep abreast of not only state-of-the-art technology but also of current legal standards."

Here are *some* examples of software patents that group has *already* granted, according to Gordon Irlam's written testimony prepared for the January hearings:

☛ Refac, a litigation company acquired patent #4,398,249, that contains a very broad claim covering "natural order recalculation" used in spreadsheets—*filed in 1970, but not issued by the Patent Office until 1983.*

☛ Cadtrak has collected large sums of money and successfully defended its monopoly on the use of the logical exclusive-OR function when applied to a bit in data memory and a bit in display memory [#4,197,590].

☛ XyQuest was reportedly forced to remove features from the latest release of the XyWrite word processor after being threatened by Productivity Software. Attempts to license the features proved unsuccessful as Productivity Software increased the fees every time XyQuest attempted to reach an agreement.

☛ Mark Williams Company has filed claims against numerous companies for using a host-independent network byte-ordering [#4,956,809].

☛ AT&T is finding itself free to start exercising its muscle. It first threatened members of the MIT X consortium alleging that the X11 windowing system was in violation of patent #4,555,775 in which AT&T patents the concept of a backing store. AT&T is now suing MCI for alleged software patent infringement.

☛ Novell is reportedly being sued for $220 million dollars by Roger Billings for infringing his patent #4,714,989 on the concept of a file server.

☛ Numerous companies have been forced to obtain licenses from RSA Data Security to use public-key cryptographic algorithms—even though the research and development were done under federal grants to Stanford and MIT. Not a patent issue, but still notable: The p.k. patents only apply to North America—mostly to the taxpayers who paid for their R&D.

☛ Unisys has claimed the data compression algorithm that is used in the Unix "compress" program.

☛ Microsoft is being sued by Stac Electronics for incorporating transparent data compression in MSDOS 6.0 [#5,049,881].

☛ And then there's the bizarre Compton patent on just about everything related to accessing multimedia files.

☛ Any word processor with a separate mode that the user selects when they wish to type in a mathematical formula [#5,122,953].

☛ Any word processor screen layout that simultaneously displays the global page heading/footing and the contents of the current page, and permits you to edit either [#4,984,162].

☛ Any word processor that has a feature that allows you to specify that a portion of the text should be shaded, such as may be useful when revising a manual, by enclosing the relevant text with command codes that turn shading on and off [#4,924,411].

☛ Any word processor that marks and makes correction to a document using two additional different colors [#5,021,972].

☛ A word processor that monitors the sequence of keys you type and tries to teach you about new features. If it notices you doing a particular sequence several times, it will display information about a simpler command sequence that may help you do what you want [#4,947,346].

☛ Use of different colors to distinguish the nesting level of nested expressions in computer programs [#4,965,765].

☛ Any spreadsheet that can automatically collapse rows that are hierarchically subordinate to another row [#5,255,356].

☛ Any spreadsheet in which a single cell can contain multiple fields [#5,247,611].

☛ Any spreadsheet in which each cell has a "next cell" attribute defining the next cell to advance to after having entered data into the current cell [#5,121,499].

☛ A file server that merges together multiple pending writes that require updating the same meta-data [#5,218,695].

☛ Remembering file access behavior and using it to control the amount of read-ahead the next time the file is opened [#5,257,370].

☛ Altering the working set of a process based upon its paging behavior and how its paging behavior changes in response to changes in its working set size [#5,247,687].

☛ Creating variable size disk partitions comprising tracks residing on multiple disks [#5,129,088].

☛ Any parallelizing compiler that estimates the execution time for each of a number of different parallelization conversions and selects the one that it thinks will be the fastest [#5,151,991].

☛ Using condition code graph analysis in a CPU simulator to determine whether it is necessary to simulate the generation of the condition codes [#4,951,195].

☛ Caching the most recent branch target code for simulating a procedure return instruction [#5,167,023].

☛ Any document storage system that has a digital camera to scan in documents, stores the documents on an optical disk, and uses optical character recognition to construct an index [#4,941,125].

☛ Generation of random numbers by feeding the output of one random generator into the input of another random number generator [#5,251,165].

☛ The computer graphics representation of a surface using an array of dots, rather than the more traditional wire frame model [#5,257,347].

☛ Quicksort implemented using a linked list of pointers to the objects to be sorted [#5,175,857].

☛ A calendar tool that includes a bar graph of the duration of each meeting and a composite bar graph of all meetings [#5,247,438].

☛ Simulating the access times associated with a CD-ROM by slowing down a hard disk [#5,121,492].

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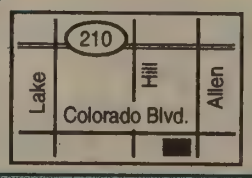

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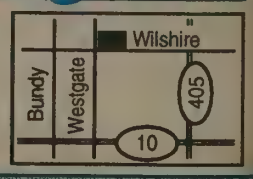

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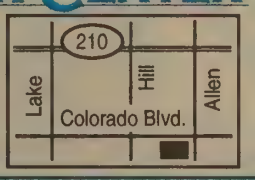

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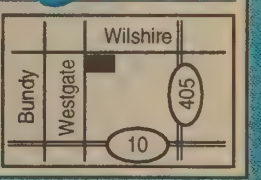

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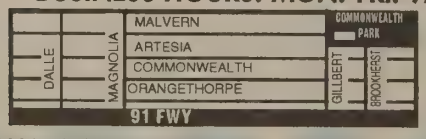

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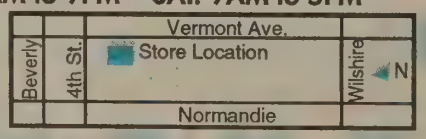

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The pre-Christmas December 20th Federal Register hearings notice said that written comments would be accepted by the Patent and Tradmark Office (PTO) if they are received by the PTO no later than **March 15th**.

Comments can be submitted by snailmail, fax, or email, and they *explicitly* request that machine-readable copies also be provided (in any one of ASCII, WordPerfect-Mac, WordPerfect-DOS, WordPerfect-Win, Word-Mac, Word-DOS, or Word-Win formats).

Comments should include name, contact vectors, organization if any, type of organization or employment, and whether the comments are for the writer only, or represent the official position of the organization.

For Official Comments

Address comments to:
Bruce Lehman, Commissioner of Patents and Trademarks
attention: Jeff Kushan, Esq.
Box 4
Patents and Trademarks Office
Washington, DC 20231
and/or by fax to: (703)305-8885
and/or by email to: comments-software@uspto.gov
For questions, call Kushan at (703)305-9300 (but don't flame him; he's not the policy maker).

For *Productive* Comments

Any fixes or further screw-ups will be done by the Congress. PTO Commissioner Lehman has already said he's going to submit recommendations to Congress, shortly (and we who will be the victims darned-well aren't going to have any chance to review them before he submits them, either).

Congressional decision makers *need* to be flamed about this, preferably with concise rationales as to why patenting intellectual thought when mimicked by machine is so outrageous and dangerous—preferably in no more than two pages. Send letters at least to:

Senate Subcommittee on Patents, Copyrights, and Trademarks

•Sen. Dennis DeConcini, Chair, 328 Hart Senate Office Bldg. [Democrat-AZ]

•Sen. Dianne Feinstein, 331 Hart Senate Office Bldg. [Democrat-CA]

Washington, DC 20510

and to:

House Subcommittee on Intellectual Property and Judicial Administration

•Rep. William J. Hughes, Chair, 207 Cannon Bldg. [Democrat-NJ]

•Rep. Don Edwards, 2201 Rayburn Bldg. [San Jose area, Democrat-CA]

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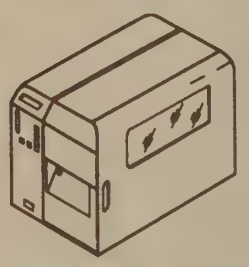

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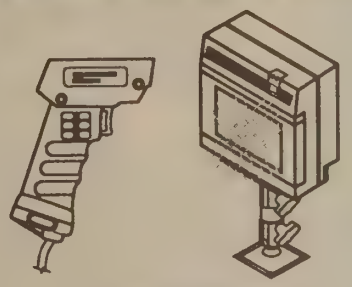

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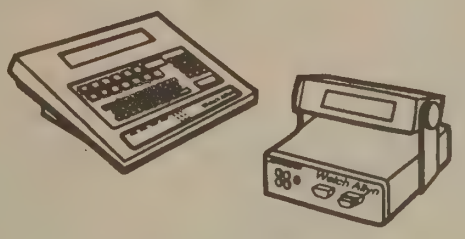

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From Mac

To (General) Magic

Macintosh Pioneers Try To Do It Again With Communication For Humans

By Mary Eisenhart
Photos: Susana Millman

Amid all the celebratory hoopla at January's Macworld Expo, members of the original Macintosh team unveiled the project they'd been working on for the last few years at a company improbably named General Magic.

In the late '80s, Marc Porat, now General Magic's chairman and CEO, came to Apple to study what might be the Next Big Thing after personal computing. Inspired by a vision of people connected to information, services, and each other wherever they were, he founded General Magic in 1990 after Apple decided not to pursue his version of the idea.

His cofounders were Bill Atkinson and Andy Hertzfeld, whose zeal about making technology accessible to non-nerds had not abated since their Mac days. And at the unveiling, they explained the company's two products: Telescript, a language designed as a standard for moving information in every conceivable digital format across the network, and Magic Cap, an operating system and interface for communication devices, which allows users to navigate and work in an environment full of real-world objects, from phones to banks.

While Magic Cap is currently being demonstrated on what's affectionately called a Bunny Box after the company's logo, this simple monochrome LCD box only hints at the capability of the underlying software to handle sound, animation, 32-bit color, and other necessities of the modern world. The first devices incorporating the technology, manufactured by various Magic Cap licensees, will appear in the marketplace later this year.

Unlike Apple with the Mac, General Magic will not sell its products directly to end-users, but rather license them to developers. It's a very different model from the Mac project, and, combined with the fact that General Magic is funded by several large multinational investors including Apple, AT&T, Matsushita, Philips, Motorola, and Sony, one that requires a lot more cooperation than a pirate project on Bandley Drive.

The General Magic team seems perfectly aware that it's entering a market that's not quite there yet, one that's already full of hopeful contenders and battered casualties. As in the old days, the courage of their convictions is unshaken. (General Magic, (415) 965-0400).

Joanna Hoffman:

"Our business model says that you start licensing, and you get a core of strategic partners together, and you work with them, be they competitors or not. It's a very difficult thing to do well. The model itself is quite modern, but implementing something like that takes quite a bit of doing."

The Iranian revolution having kept her away from a dig, **Joanna Hoffman** was an unemployed archeologist when Jef Raskin, original head of the Macintosh project, recruited her. "His perspective was that he should get people in the project that would make good users," she says now, as opposed to more people with technical expertise. Steve Jobs took over the project shortly thereafter and asked her if she knew about marketing; during the Mac's long gestation, she eventually wrote its first business and marketing plans, and put together the first user interface guidelines, among other projects.

Now vice president of marketing at General Magic, she recalls leaving Apple in 1985 during a period she calls "the beginning of the end of idealism." The particular last straw, she said, was when some corporate realpolitik dictated renaming the Lisa the Macintosh XL.

That was then, this is now. "If I had the temperament of me ten years ago," she says, "I would never have been able to survive at General Magic. You almost become disenchanted with the human race every day, and you have to get up the next day and continue with your enthusiasm and with your excitement and so on, because you still feel that what you're doing is worthwhile. That's what growing up means—you come to accept the weakness of other people around you and somehow manage to live in the world without killing yourself.

"In many ways I think Apple's still a very idealistic company. Once you have a vision in your DNA, it's very difficult to get rid of it, even if you get people who are pragmatic and not the kind of people who would fall prey to visionary ideals. I think being visionary is part of Apple's DNA, and they keep continuing that tradition."

A lot of people in this company came from Apple—did they bring their DNA with them?

If there's anything that General Magic has an ample supply of, that's vision. I really do believe the reason that so many people gravitated to General Magic from the old Apple crew is because Marc's vision was so compelling—an entire world of people that could communicate with each other, not just by telephone but through an integrated mechanism by which they can personalize their communication. Whether they're carrying little devices around with them or using personal computers or television or whatever else, they have one continuous experience which helps them communicate under any circumstances.

That was very compelling. The main way in which General Magic is different from Apple is that the business model is also quite visionary. Three years ago when we started thinking about it, there weren't many people aside from Microsoft and Adobe who were licensing, not just to one customer but to several. And to competing factions.

If you think about it, Microsoft did not become successful by openly licensing its software. The way Microsoft became successful was by getting into bed with IBM. You had to service one very demanding, very difficult customer, but one customer. And then, once IBM gave it the marketing kick, there was a clause in the contract that said Microsoft can license it, that there is no exclusive with IBM.

And that's when they started licensing to other people.

In our case, the business model says that you start licensing, and you get a core of strategic partners together, and you work with them, be they competitors or not.

It's a very difficult thing to do well. The model itself is quite modern, but implementing something like that takes quite a bit of doing.

It's different from the Mac, which was developed pretty independently.

The thing that was different, you're right, was that we had control. We thought Apple was big and bureaucratic, but we were a tiny little entity inside Apple, pretty insulated from the rest of Apple. And at that time Apple was not a terribly large company, and it wasn't terribly bureaucratic either.

So there was a great deal of control, and I think that that's one of the ways in which a young crew like that could be successful. Because we certainly were not mature enough in our behavior—or jaded enough, I should say—to really know how to handle opposing demands or contradictory input. To that extent, it was a very well suited environment for that cast of characters.

I think that ten years ago we wouldn't have been able to do it. There would have been a mass exodus of the Macintosh team had they been working in a General Magic environment.

In many ways this is the best of both worlds in the sense that we're a startup, we have a startup atmosphere, there's no politics, there's no bureaucracy. It's a bunch of enthusiastic people who are doing very well working on a set of technologies, and hopefully products, that they love.

And it's funded by huge companies with big impressive names and market clout and some of the best companies in the world.

That's the best of it.

The worst of all worlds is that each one of them thinks that they know best.

This is not going to be design by committee, we're not going to be pushed into things that we don't think are appropriate. Bill Atkinson is very good at this—he keeps reminding people that what we're doing is for the customer. It's not for your business plan, it's not based on what you think we should be doing, it's based on what will appeal to the customer, and how can we keep the customer satisfied and happy. Both Bill and Andy are extremely staunch in that regard, and we've been able to maintain a lot of integrity.

As vice president of marketing, who do you market to? Since you're not selling directly to the consumer, you've got different issues to deal with.

Until recently, we worked with engineering, defining the product. We're in between our licensees and engineering, trying to understand what path the product is going to take, from our facilities into their manufacturing organizations. We also do a lot of user testing.

The other things are classical marketing things—how do you position it, with respect to our primary customers, who are the licensees, and also the third-party developers, as well as in the eyes of the end-user? And in what way do we bring any of this into the consciousness of the user, since we don't touch the user directly? It's going to be a little logo on a Motorola device, or a Sony device or a Matsushita device or whatever. How do we get people to understand the spirit of the company and the spirit of the product?

That means working closely with our licensees, making sure they capture the spirit, making sure that they can communicate about it, in ways that do it justice. Because they have their own agendas, and some of them are competitors with each other.

The applicability of these platforms ranges anywhere from a conventional enterprise into these wild, crazy, futuristic things of electronic superhighways and electronic shopping in markets and so on.

When you have technology that spans such a broad spectrum, you have to work very hard at trying to figure out where you target on that spectrum. Where do you go?

And we have chosen kind of the balls-to-the-wall approach, to try to aim for the glorious dream, as opposed to trying to go back into the business-clothes environment and innovate in that domain. Not that we don't want to bring our technologies into the enterprise, we do, but we have chosen as our first and primary focus public services and information providers, as well as consumers at large and customers at large, as opposed to the business.

I think we'll have the same bumps we had with the Macintosh, in different ways—bumps that not just the Macintosh but any new technology has. Inevitably, we'll learn from the market and we'll improve, as long as we have the staying power and the longevity to do it.

That was another good thing about Apple, it had the cash cow in the Apple

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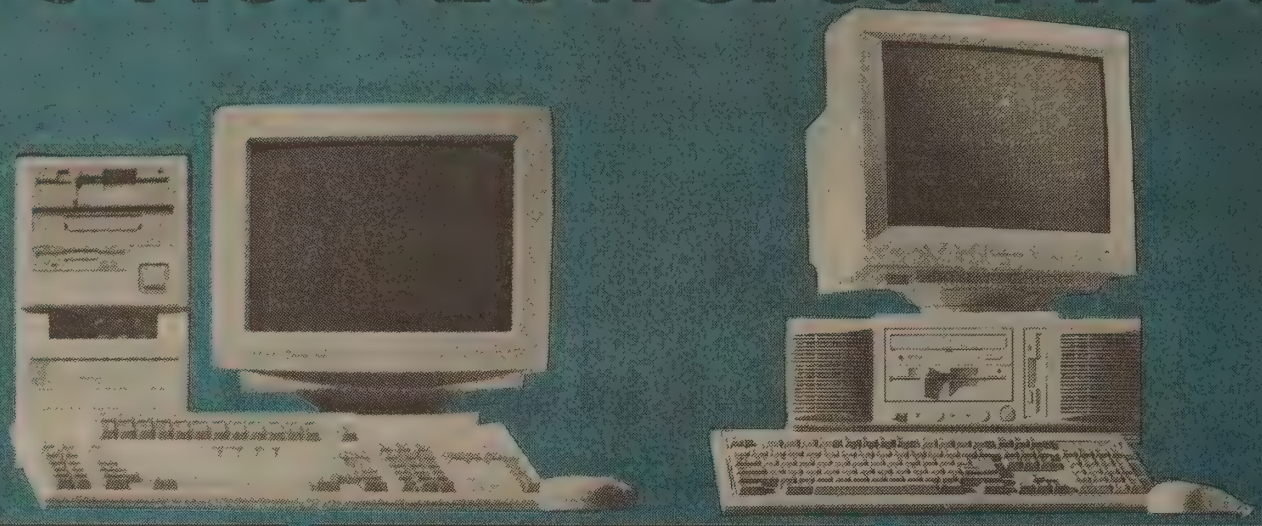

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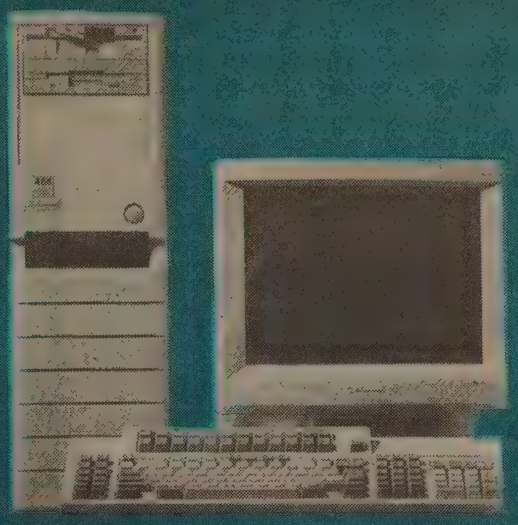

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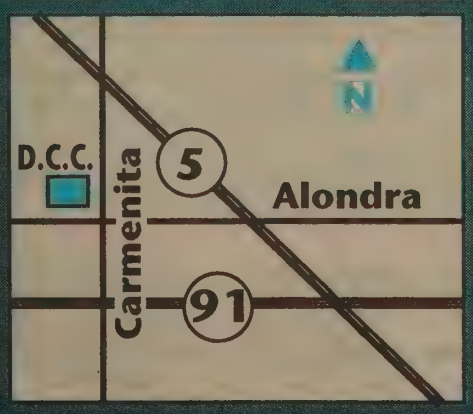

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II to last it for a while. In our case, it would mean that our partners have the staying power, and I think they do. None of them are looking at it as an instant success.

So what kind of products do you expect to see initially? They won't all look like Bunny Boxes.

Hopefully at least one of them will.

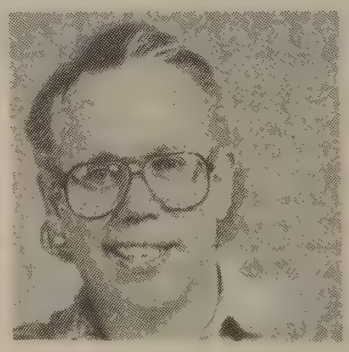
I think what you will see is a great variation in the communication options they offer. It's a communicator, and therefore that's the area in which they will choose to differentiate themselves. Some will be wire line, others will be wireless, others will have one-way wires, two-way, all sorts of options for different kinds of communications.

One of my favorite products is not even mobile, it's stationary—at home I have a fax machine, my computer, I have an answering machine and a telephone, and I know that there are these products which integrate at least the telephone, the answering machine, and the fax. Well, wouldn't it be wonderful if your email was integrated into that too? So you have this one thing that does all your communication. I would love to see machines like that come out.

That's one that particularly appeals to me. I think that what will happen is as soon as the licensees ship their first-generation products, it's much easier for them to turn around and actually create a product like that. It's just pushing that first product out the door that is going to require the courage, and after that you create variations on the theme, and I don't know yet what variations they will choose.

Do you envision being on the set-top-cable boxes for interactive TV?

It's a vision that we really feel very close to, because that's the ultimate consumer vision—what's more consumer than television? Our technologies are completely appropriate; the difficulty is as a small company, where should we be playing in that area, and I think we haven't quite figured that out yet. And with whom.



Bill Atkinson, General Magic's chief scientist, wrote MacPaint and was the principal author of Hypercard at Apple. Of his current role, he says, "I think of myself as a customer advocate.

"I always step outside of the technology, outside of the narrow-sighted sort of self-delusion that our team, that any team, gets in when you're hustling on something. I stand over there and say, 'Okay, so I just recommended that my brother buy one of these with his own money. What's the experience like?' My commitment is that six months after somebody buys one of these, at least 75% of the people say, 'I'm glad I spent my money on it.' Instead of being the pusher of technology, I'm the pusher of people. I like people. I'm an advocate of people, not the advocate of any technology."

Is there a theme running through MacPaint and HyperCard and what General Magic is trying to do?

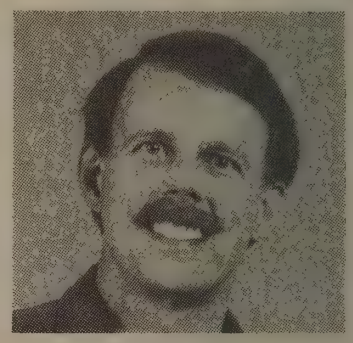
I think it's empowerment. It's much easier to provide tools for people that have passions about an area or creative ideas or specialized knowledge, to give them a tool to express themselves, than it is to take those people who have technical expertise, and try to teach them specialized knowledge or passion.

It's easier to take somebody with passion and release them with a new language or a new means of expression.

I think the essence of what I've been doing is making tools to empower people to their agenda. Not to mine. If I give someone a crescent wrench, a very valid use is to bop her brother over the head with it. That's empowerment [*laughs*]. That fundamentally comes from a belief that people are good, that giving more people more power brings good into the planet. And that people will use that power in ways that make the planet a better place.

There's also kind of a secondary theme that's going on about communication. MacPaint was a drawing tool that let people make pictures that they would basically print out and put on a wall or send to somebody. They would

Under The Hood:
Technical And Social Issues Of Software Design



Jim White, General Magic's vice president of communication engineering, was inspired by Adobe's PostScript language and its use of the printer as a computer, and wondered if the same principle couldn't be extended to networks. "It occurred to me," he says, "that you could conceivably make a network that was a computing environment, rather than a network that was just plumbing—put in bits here, they fall out there. What if the bits were smart, they were a program, and they could get inside the network and start controlling their own transport through a network?"

As people currently piling onto the Internet can attest, computer-based interaction winds up raising at least as many social issues as technical ones. With General Magic's appointed mission of making electronic communications more accessible to everyone come not only interface issues as represented in Magic Cap, but infrastructure issues governing the interactions of the network's users.

What issues arise when millions of people are dispatching their virtual emissaries all over the ether to spend money, share information, socialize? White explains the Telescript view.

There's a lot of talk about "agents"? What's an agent?

An agent is basically a little program that, because of the language in which it's written, has the ability to move itself around a network.

From a system standpoint it's involved, but from a conceptual standpoint it's very simple. A program is born in one machine, does some stuff, decides for whatever reason that it needs to go to some other machine to carry on, and does so by using the facilities of this language in which it is written.

From an end-user standpoint, it's helpful, sometimes, to personify it a little bit, to think of it as some sort of little creature or robot or something that goes out into the network and does what you tell it to do. If you wanted to search the news media for a certain kind of information, even if you wanted to go to all the different wire services and the local newspaper and various places, you could have an agent that would go visit each of those places in turn, interact with it in order to obtain the information that you wanted, and come back and tell you the sum total of what it learned. Or if you wanted to go find the best price on a VCR by visiting electronic representatives of all the retail shops, you can do that as well.

It's a way that a user can be represented in a large network, in a way that avoids the need for the user to deal directly with all these information services. The real power of the agent is where you don't have a need to actually see on the screen the representation of each of these information services, you just send an agent to programatically ferret out the information that you want and bring it back to you. You get it done much more quickly and much more easily from an end-user standpoint.

One of the concerns I've heard raised is the issue of what's to stop someone from sending Evil Agents out to wreak havoc?

If there's any one theme or a major aspect of the work that we've been engaged in with Telescript since we invented the basic notion of it, it's this issue of safety.

You're right to be concerned about it. If you didn't have an answer, you'd have a technology that just was academically interesting but had no commercial possibilities.

The question that you ask is sometimes asked as, "Why isn't an agent a virus?"

A virus is a piece of code that finds its way into your machine like your

continued on page 115

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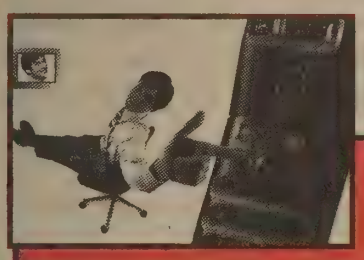

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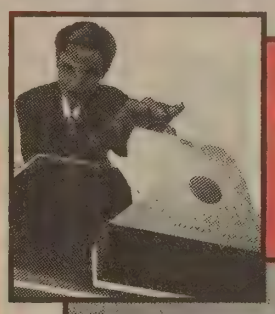

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communicate via ink. In fact the major use of a personal computer is to make documents. It is a communicating device, but via ink. You make picture documents and numbers documents and word documents, and communicate them through the mail or through desktop publishing.

As Marc's research on what was beyond personal computing proceeded, his realization was that the bulk of people's life isn't spent at the desk making documents. What else is there?

As we're in the middle of a convergence of many different technologies, the consumer electronics guys are getting more and more intelligence into their devices, you have more and more display, communications devices. Cell phones are getting smaller and have more built-in intelligence, or at least the Rolodex built in. Computers are getting smaller and more portable.

As many different technologies are leaning toward one small electronic assistant that would go with you everywhere all the time, the question is what's it good for, what would you use it for?

How do you support a person? Instead of starting with some technology like a CD and saying, "What's a CD good for?", let's start with a person and say, "What's a person's life like? What are the kinds of things that you could support a person with?"

What about the rest of your life when you're out and around, when you're not at your desk, and what about the other things you do besides make documents?

Marc tried to narrow down the major areas that we could support people in. Not from a technocentric view, but from a human-centric view. What do people want to do?

There were three areas he narrowed down. One of the real important ones is communication, fundamentally because it's at the basis of every relationship—anything from an acquaintance to a business relationship to a friendship to an intimate relationship—all of those don't work without communications. Cut off communications and all friendships and all relationships die.

The second is managing the complexity of life, getting to where you're supposed to be. Kind of the logistics and organization of life—just a mind prosthesis or something [*laughs*] to help you remember things, help you kind of organize and choose and make priorities. That's related to the typical things that PIMs and organizers did, but it could be done a lot better if communication is the focus.

Thirdly, there's an important area of "I need to know." It's like accessing anything from information to entertainment. It's the notion that this thing is not just a box all by itself, but that it's connected out into the world to lots of information. And that connectedness is where the power comes from.

If I had to choose between my telephone and my personal computer today, the telephone is the powerful tool, because of the people I can reach. And the connectedness is what would make a personal communicator something that people would desire to own.

So from there we started thinking about, well, all right let's look at communication. What's wrong with communication now, and how can we make it better?

I work. I don't see my kids much during the day. My wife works. She doesn't see our kids much during the day. I think for a lot of people that's true—somebody was just telling me that in 80% of American households, both parents have to work now.

My daughter used to call me at work, and pretty quickly she picked up that I'm under load here. I would be nice to her on the phone, but she'd still catch kind of an undercurrent of "Well, what is it you want? Can I get off the phone and get back to work?" Also, often I'd be with somebody and the phone would ring and ring and ring and ring, and finally I'd pick it up, and I wouldn't say so, but the tone was "Yeah? What do you want?"

I think about that. When the phone rings I have kind of an ambivalent reaction to it, partly delight that maybe someone would call that I was looking forward to hearing from. But also partly it's "Don't bother me right now!"

Imagine that you took a cellular pocket phone, and it cost fifty bucks, and it was only fifty bucks a month for the service so lots of people could have them. It wouldn't be just a mobile professionals' elite thing. Imagine if kids had pocket phones. Imagine if you had a room with fifty people in it and they all had pocket phones. The first problem you'd run into is that they'd always be ringing. There'd be not one moment that at least one of those fifty phones wasn't ringing.

So the first thing you've got to deal with is a more graceful way of being noti-

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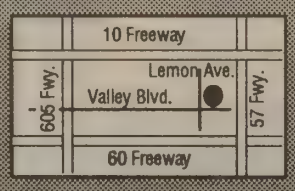

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"There will be little pocketable, electronic communicators that merge telephony and messaging. The question that I come up with is how is that going to feel? Is that going to be something that people find threatening or irritating, or is that going to be something that people welcome into their lives?"

fied. We came up with this notion of "Well, what if you could just drop a little card in out of the sky?" We call it a Telecard, because it's from a distance, and it's sort of like a telephone, but it's a card. A little message just drops in out of the sky, silently—if you're in a meeting you might set it to "silent"; if you're not, you might set it to a little "chirp once" kind of thing, "Don't bother me, but give me the message."

And it would be with me all the time. Like right now, somebody couldn't reach me on my phone—if [my wife] Sioux had an emergency, she couldn't reach me. But if I had this personal communicator in my pocket, and she could slide a card in my pocket...

So I want some graceful communication that is not only for my benefit, but also for her benefit, because she'll know it's safe to drop it in my pocket. She'll know she won't be troubling me. So many times when I make a phone call, I'm glad I got the answering machine. I wish I could have specified "I just want the answering machine," but you can't. That's kind of dumb. So I'd like to be able to graciously slip a note in somebody's pocket.

I think of the emotional side—how do I feel when I look at this note? I think about how I feel when I'm going through my regular mail. I get about that much a week, about eight inches thick, and it's kind of a pain to dig through. But when I get to a postcard, where one side is a nice color picture and the other side has a small amount of writing on it, and somebody's name, and it's handwritten, so you get more of a personal touch to it—I'm always pleased to get postcards, right? And I think about pulling it out of your pocket and saying, "Ah! I got a card! I got a Telecard!"

That feeling is what we're going after here on the emotional side. It's kind of like Kodak doesn't sell film and cameras based on how sharp their lenses are and how consistent their color quality is—those are attributes their products have. How they sell it is by showing the benefit in a person's life. How do you feel when they show a parent taking a picture of a child at a precious moment that's going to be gone in a couple of years as the child is through that stage? Kodak Moments is really more of an emotional appeal to the benefit to one's lifestyle.

That's what I'm looking at, in terms of how we can take a convergence of technologies that's going to happen with or without General Magic. There will be little pocketable, electronic communicators that merge telephony and messaging. The question that I come up with is how is that going to feel? Is that going to be something that people find threatening or irritating, or is that going to be something that people welcome into their lives?

That's an opportunity. I think the opportunity is just like with the Macintosh. What the Mac team contributed is the difference between DOS and Macintosh.

Say more about that.

A lot of people are going to use personal computers. It's not just how useful are they. It's how graceful are they. How can you make a technology not only accessible to more people, but make it so people welcome it into their lives.

The reaction to the Macintosh was not purely functional or practical. It was emotional. It was "I *want* that. I *like* that. I want it in my life."

Initially it was actually a little hard to justify it, with 128K and a single floppy. It was more of an emotional purchase. As it got more practical, that made it easier to buy. But people fundamentally said they caught the excitement and love and energy that the Mac team put into that little product. And they said, "*Yeah!* I want one of those!"

Also there was a shift in software, away from a textual thing, where, pretty much, the computer would put text out, and usually it was menu screens, and you'd type a digit and that would choose one item. Usually the computer

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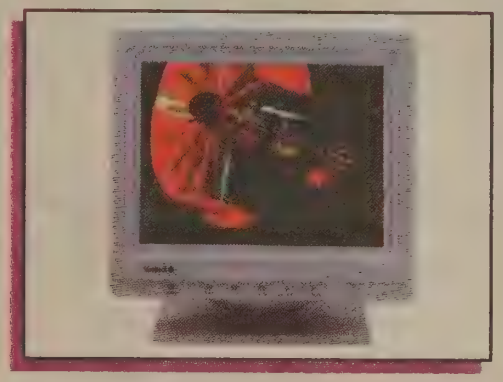

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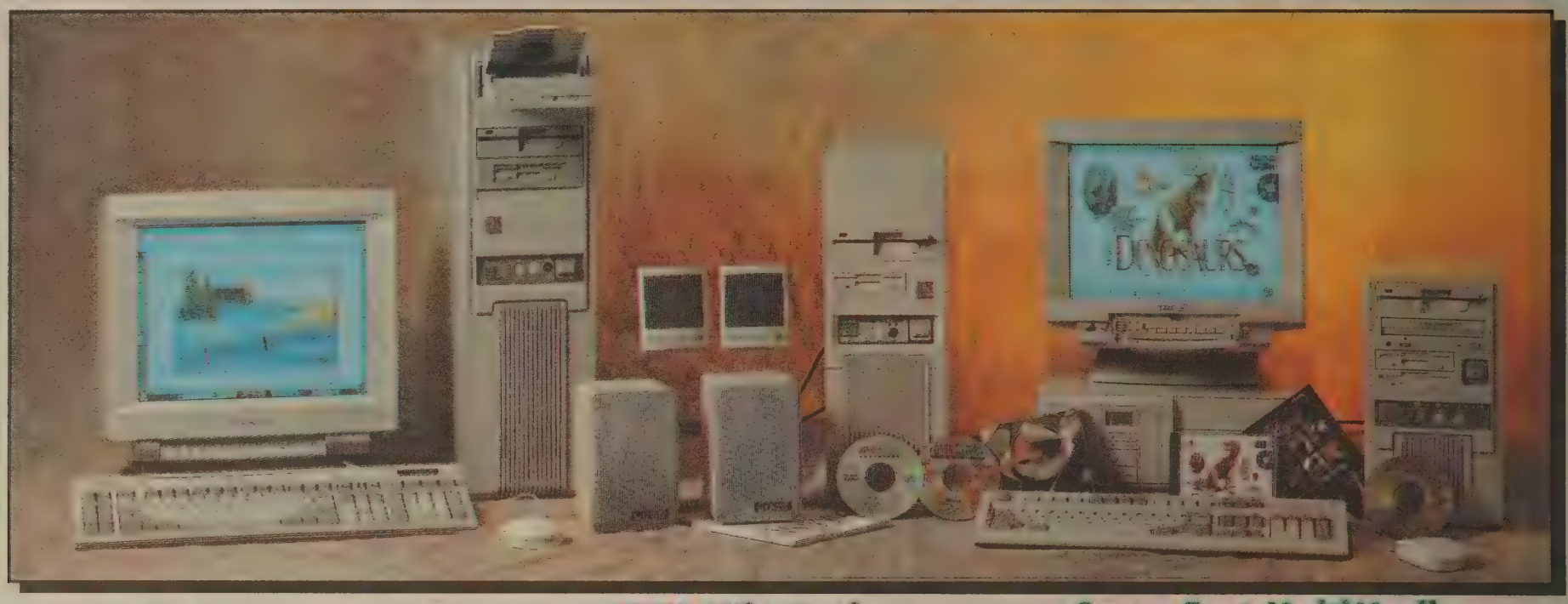

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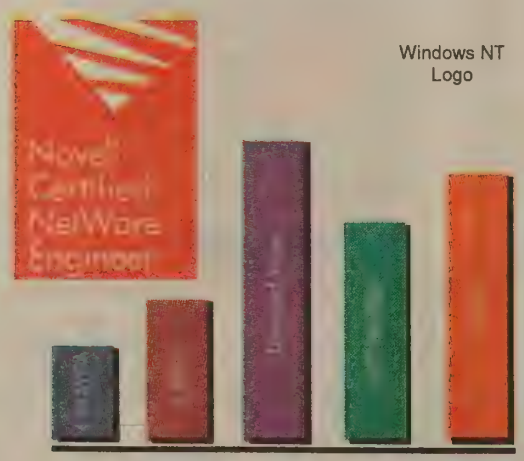

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would drive and the user would be the respondent or slave. Well, the graphical paradigm not only used more pictures, but it also shifted the driver's seat.

A person running a Macintosh is pretty much driving *it*, poking at things and the computer responds. It's opening up a more creative mindset to start with. I think Macintoshes appealed to a group of people that was creative, and would never have stood for DOS.

That's one shift we got to see there. I think there's a much bigger shift coming upon us that we're in the middle of. As we go toward communicating computation, we go away from software as a product industry where you make the shrinkwrap box you buy once, and toward a service industry, an ongoing relationship between a publisher and a reader, much like a magazine compared to a book.

A subscription model rather than a sales model.

Like a cable subscription, or a newspaper.

Now, a newspaper doesn't happen until there's some carrier to get the newspaper distributed, and that's why we've been working not only on the user interface device, Magic Cap, but also on the new post office, which is the Telescript-enabled network. So how do you get the stuff out? How do you get a suitable platform for service-based software to run on?

And there's where Telescript comes in. You know how you can't make a new telephone unless you revamp the wires to it? That's what we're trying to do. Magic Cap can be looked at as putting a face on the telephone. If you use the telephone today, shut your eyes and you're at no disadvantage. There's only twelve keys; a blind person is at no disadvantage. That tells you how little it's using your eyes.

People think call forwarding is hard. How simple, if you had a face that changed. If you put buttons for call forward and prompting instructions of how to do it, anybody could make a conference call. The so-called advanced features that are on every PBX in the country—every business phone has these—nobody can access them, any more than they can program their VCRs, because you're trying to work through a twelve-key interface with fixed labels on it, instead of using your eyes, and seeing, "Okay, here's conference call," and choose this person and this person and this person and say, "Dial," and then it goes and makes the connection and they're all there. You see pictures of who's online and stuff like that. Putting a visual interface on the phone makes those features easily accessible.

That's just the interface side of it.

Think about television. There's a user interface device, the TV set. There's a network, the cable and broadcast station, and your services available through the network that make up the whole experience, the shows I want to watch.

The telephone's the same thing. There's a user interface device, the handset, the telephone set. There's the network of fiber and copper, and there's the services, the people and businesses that I'd want to reach through this phone. If any one of the three is missing, the experience doesn't happen.

A personal communicator is basically a telephone with a face. It requires, again, a network, which is a Telescript-enabled network, and the services, services you'd want to interact with. That's this new whole kind of software that's going to come about.

The network has heretofore been a bit pipe—you put bits in one end, the same bits come out the other end, and unless both ends of the wire have a piece of software that agrees upon what's going to be sent, what's going to be interpreted, there's no meaning to the bits.

What Telescript does is transforms the network into a platform that software runs on. Just like the Macintosh is a platform—third-party guys can write software for it, they don't have to go to Apple and get the ROMs revised and get all the Macintoshes recalled and everybody updated. You can just distribute software on a floppy, somebody could buy the software and put it on their Macintosh, use it there and it will work. Add features to individual Macintoshes without having to rev all Macintoshes, and without having to go back to the manufacturer. That's what makes it a platform. Same thing for Windows—I'm not Mac-centric, I'm saying, "What is a platform?"

The network has not been a platform. If you want to add a new feature to a network in the client-server model, there's typically one server and a million clients. To add a feature you've got to go rev the million clients.

Telescript turns that situation around into a platform, where your features can actually travel with a message as it's going from place to place on the planet and interacting. You don't have to get in line behind General Magic or AT&T or some network in order to make these features happen. It's an open platform.

Let's say in my office I wanted a routing slip. I could put three names on it. It would take this message to the first person, wait for their signature, and then to the second person and wait for their signature, and the third person, and then back to me. And if anybody denied or held it up too long, bring it back to me.

Now to get that added into an X400 system is nigh impossible because every X400 client has to implement it in order for it to work.

It's an afternoon's work for a Telescript hacker to make a piece of stationery that lots of people then can use without knowing Telescript. The vast majority of people that use Telescript will never see Telescript. They'll get the benefits of it, much like Macintosh users get the benefits of PostScript printing, but they don't know that, they don't deal with PostScript. What they'll deal with is "Hey, here's this cool form I got from Hallmark," and Hallmark didn't have to take down the network to get it to work.

Similarly, with this Telescript base, you can add new features, and you can customize your own communications to the way that you really work.

I look at what happens when I sit down at my personal computer at my desk now. I get 150 or so emails a day, and it's kind of a chore. And I notice some things about it that could make it less of a chore.

To give you a good analogy I'll talk about the paper mail I get in my mailbox at home.

There are certain categories of things, and I don't really mind getting junk mail, what I mind is it's mixed in with important business letters, it's mixed in with my personal letters and my bills. And if I had a separate pile of junk mail there, I could choose to ignore it if I wanted to. Like in *Byte* magazine I get these little cellophane-wrapped packets of cards, infocards. And a lot of months I just throw the little packet out, and I'm not disturbed by it, I'm not worried that I lost an important bill or anything, because I know it's just unsolicited offers. They're not even specifically targeted at me. Okay? So I don't think I've missed much.

Sometimes I'll open it and I'll go flip-flip-flip-flip-[*pulls imaginary card from stack*]! flip-flip-flip-flip-[*pulls another imaginary card from stack*]! If there were fifty envelopes there, no way would I go through it, but with fifty cards I've got a chance, because I can do it in about a second apiece.

Well, what I need are better ways for handling communication. As I'm getting overloaded, I can play ostrich and hide, as 70% of the telephones are unlisted.

To be totally honest I have to remind you that it's a little bit biased because some of those are fax machines, and people don't list their fax machines.

But people are playing ostrich. They are hiding from the information onslaught, the information overload. One way is to actually be out of communication. I've seen a little bit of a trend of people to stop using phone answering machines. At first, it was impolite when you had an answering machine. But now, it's impolite when you don't have one.

And a lot of people are finding themselves to be slaves of the answering machine. They get home and there's twenty damn messages. And they're thinking about quality of life, and they're thinking, "I just got home, I'm tired, I want to spend some time with my kid, I want to spend some time with my wife... Is this really a good way to live my life?" And they say, "Well, if I don't have the answering machine, if it's important, they'll find me, and if it's not, *I don't want 'em to.*" [*laughs*] Doing a certain amount of editing my life.

So what I need is a way to customize and filter my mail. I have a person that I pay to pay my bills for me and give me summaries, so I have that mail redirected to her. Another pile of magazines to read when I get the urge. Another pile that's personal letters I almost always read immediately.

Here's a box I wish I had that I don't have, that I bet a lot of people wish they had: Imagine you had a cardboard box that, any time you saw an advertisement that you didn't want to ever get again, you could throw it in that box, and a little elf would come and take those all away and write a postcard to that company saying "Please take me off your mailing list." And then, not really trusting them to take you off their mailing list reliably, that same little elf would filter all my mail before it came to me, and if anything did *accidentally* slip through, it would put it right in the trash so I never saw it.

I get an L.L. Bean catalog about every three or four weeks. And there's an L.L. Bean store down the block from me, [*laughs*] and I'd *never* buy anything from the catalog if I can go look at the stuff. I haven't taken the trouble to write L.L. Bean and say, "Please take me off your mailing list." Well, I'm thinking of

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an electronic assistant here that would aid me in things like that, where first of all I can redirect some kinds of messages; second, I can reject whole classes of messages and say, "I don't want this. Don't ever send it to me again." And enforce that.

An elf. [*laughs*] Or an agent. It's sort of adaptive. It's got to be very personal, custom, because you're not going to guess ahead what all the filters everybody wants are. I want a much higher degree of customizability than I can get with any existing mail system, and that's part of what Telescript buys me.

The next thing it does is it lets me decouple from time.

A business example would be, I call up Dow Jones every morning and ask, "How's Apple stock doing? Is it over 100? Is it time to sell yet?" And every morning I keep calling.

Instead, I could send an agent out to Dow Jones with the instructions "Let me know if Apple breaks 100." And forget about the agent, no more calls! Six months later, I get a card dropping out of the sky saying,"Psst! Apple stock just broke 100!" Basically, I've sent out my agent to do my bidding, my will. My agent is living in the network, living there doing work for me.

On a more personal level, I can send an agent to my bank saying, "Let me know if my checking account gets below $600. Send me a card." And the bank doesn't have to have prearranged to have such a service.

As long as the bank has Telescript?

As long as the bank provides a Telescript connection. With appropriate authority, I can inquire my balance. I can have this agent, or a third-party hacker can put together a balance-watching agent. I can say, "Oooh, I like that," and get that agent from the third party, and send that agent out there with a mission to warn me whenever I get below a certain amount.

And forget about that agent. It's now installed and doing this thing. I've still got a fishing line to him, I can reel him in. He has a budget, how much he's allowed to spend on my behalf—don't spend more than 25¢ a month to do this service, or whatever. I can keep track of how much I'm spending on these agents, and I can recall them if I want.

How would you recall them?

They're on my user interface device; I have little animated robots that look like agents. That's just a way of representing one, that can make it physical enough, people can understand it. I can tap on that agent and he tells me what he's up to. And I say, "Okay, I want to cancel you," and it says, "You're sure?" "Fine."

That basically sends out a message to that agent saying, "Stop, I don't want you any more. Quit."

Supposing you only wanted it to perform this function within a certain time frame.

I give it some time limits. I say, "You expire after this time. You have only these certain privileges. You have only this certain budget."

For example, instead of receiving advertisements all the time for travel, what I'd like to do is this: the one time a year that I'm planning a trip to Hawaii for my family, I send out an agent that will go and wait in an electronic marketplace with other travel agents. I'll say, "Go find me a trip to Hawaii with certain specifications—this general range, I don't want to spend more than this much on the trip, I'm looking for airfare and two rooms for these ages," and kind of send it out there to meet with other travel agents, sift through five hundred offers, and come back with twenty that sound good. And I'll review those twenty.

Basically I turn junk mail inside out. It's a pull, what I'm interested in, and when I'm done with this vacation, it isn't going to keep raining junk mail on me. I can choose to say, "I don't want any unsolicited offers *at all*. This is my personal mail here. I don't want stuff I didn't ask for."

Also, you know, there's a social side to this. A lot of times I get on mailing lists. I cannot tell the mailing list administrator to take me off the list, because that means I don't value their input. What I would love to do is locally tell my mail agent—"Listen, uh..."

There's two different ways that I could cancel that. I could say, "Please ask him not to send it any more." Or I could say, "Don't bother showing it to me." [*laughs*] Or even a third is, "Put it in a file that if I'm ever interested in that area I can look at what his latest inputs were."

I think this ability to customize communications is really essential.

So I think what we're doing is a little bit like the Macintosh in that what we're doing is "How do you take a new technology and find the right fit where people can welcome it into their lives, rather than submit to it and be threatened by it and feel stupid because of it?" The basic concept is kind of like electronic mail in the pocket for Joe Sixpack. It's making communications more graceful, the face on the telephone. Making it so you have more options about communication.

I would guess that ten years from now, many communications are initiated by a card and completed by a call. There are some that are initiated by a card, and I'll respond just by pressing a "Yes, I will attend"; it gets put in my calendar, a reply gets sent. Or jot a little something on it and send it back. That's very easy.

When it requires some conversation about it, I may want to say, "Talk," and I'll call up and talk to the person. If they've just dropped it in my pocket a minute or two ago, the odds are they are right there and I'm not going to be playing phone tag with them. If it's more delicate than that, we need to see each other's faces when we're talking, the more proper response would be to schedule an appointment.

Your communicator talks to their communicator and they set up an appointment...

[*laughs*] Have your communicator talk to my communicator and we'll do lunch!

So I think that basically making communications more graceful is what we're up to. We see it as part of empowering people. Making tools and leverage off of many other creative people is what we've been doing, I've been doing, Andy's been doing. The team of people here have amazing backgrounds—every one of them have been very creative and hardworking individuals that have track records of contributing in the industry. What we're doing here is very much a group artwork, kind of like doing a movie is group artwork or building a house is group artwork. We're doing a good artwork, which is a user interface and an enabling technology for graceful communication.

If today I were to ask you to stop using your telephone, never make another call, never receive another call, you'd think that would be pretty crippling. Because it has enhanced your life, much as we complain about it, the telephone is a good force in our lives, it made our lives better.

Unlike the personal computer, which got a facelift with Macintosh—there was already such a thing, but it was being redefined—the personal communicator is a new thing that's just being born. And if it's as successful, then maybe ten years from now we'll look back, and I'll ask you ten years from now to stop using your personal communicator, and you'll have that same kind of feeling, like, "No, this is too enabling in my life. This is how I keep in touch. This is how I'm in touch with my loved ones throughout the day. I'm in touch with my coworkers on projects. I do more collaborative work because of it. I collaborate with people all over the planet because of it. It has broken down some barriers between cultures and nations. It's fundamental, not peripheral, to the way I live."

It's in the same category of things as my glasses, my watch, my wallet, my checkbook, my pocket knife, my credit cards—the things that I think of as, "if I were teleported to Mars today, what would be with me?" The tools that are valuable enough to me that I wear them. I wear my glasses. I wear my watch. I don't carry it with me. I think these personal communicators have to evolve to be valuable enough and small enough and fun enough and pleasant enough and welcome enough that people choose to wear them. Whether they wear them in some kind of pouch, or whether they get small enough they can go in pockets—I just keep thinking that that's where this is headed. Not a peripheral thing like a Walkman is, a tool that I use maybe once every couple of weeks if that. This is something that's more like my watch that goes with me when I go.

I think that's really the biggest contribution that Magic can make, making a more humane direction to this whole thing, such that people do welcome the personal communicator and enjoy it and take it into their lives.

Andy Hertzfeld, software wizard and senior VP, works primarily on Magic Cap, having had a strong interest in user interfaces since he got his first Apple II. "I had the inclination to be a system programmer throughout my studies at school, but they never let me be the one who could tweak the interrupt handlers and the fundamental programming. I was dying to work at

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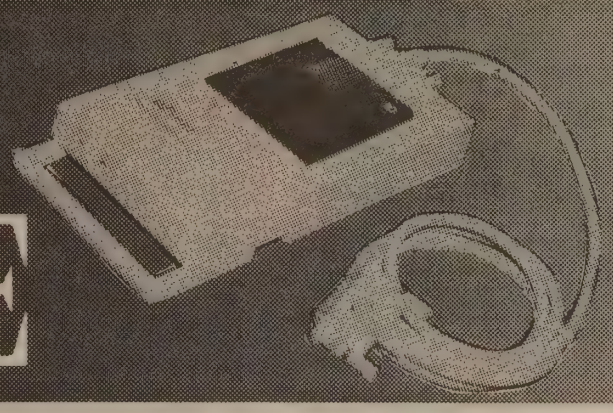

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Andy Hertzfeld:

"Computers are so malleable, and semiconductor progress is such that there's so much more memory every four or five years that the rules have to be rewritten."

that level, and the personal computer was a great solution. As a matter of fact, the first evening I got my Apple II, I remember the pleasure of just turning it on and turning it off. Turning it on, turning it off. I was in control of it. It was all mine. It was the first computer I could do that with."

Things have progressed a good deal since, thanks in some measure to Hertzfeld's work on the Mac. He says, "I want to bring to people who are not technically inclined or skilled the same joy that I got from getting my first personal computer and finding that it was an incredible medium for reflecting my thoughts and desires. An empowering tool. I want to bring that to everyone."

What was the theory behind making the Macintosh work like it did?

We wanted to make it more accessible to people. Which is to say, make it easier to use.

The basic way we made it easier to use was by removing abstraction and making it seem more concrete.

That's what people have the hardest time with, abstraction. Everyone can use things in the real world, because things are very solid and real. The realm of ideas is a lot harder for most people to get a handle on.

What the Macintosh did, through its desktop metaphor, is give the files a tangible existence. Even though we know that they're still abstract, that the little icons are not the files, users are seduced into thinking they're the files. And then when you drag it off into the trash, "Oh, I'm grabbing the file!" with my sort of proxy hand, the mouse, and dropping it in the trash can. It's easy because it's concrete. It's not abstract.

The other thing is if you use any kind of command-line interface, you have to keep all the possibilities in your head at all times, whereas the graphic user interface puts the possibilities right in front of you. And so with Magic Cap, we're just taking that concreteness to a new level, with a metaphor that emulates the real world.

People can bring their lifetime of intuition and experience that they've been building up about the real world to the world on the other side of the screen. They know how to use it before they ever experience it, if we've done our job well enough.

What's possible now that wasn't possible ten years ago?

Well, I would say that the key thing the industry has discovered is object-oriented programming, that there's a way of building large systems by encapsulating the complexity, but also building systems that are uniquely configurable, that are not all bound at compile time. They can be changed. They also can be open, the functionality can be added in much smaller granularity than you could without the object-oriented programming. And so Magic Cap exploits that to do a much better job than we could have done with the Mac.

That's part of it. The other part of it is, of course, Moore's Law and all—where a megabyte was way too much for the original Mac to have, it's a small amount these days. The Magic Cap products will typically ship with about 4MB of memory, which is thirty-two times the amount we had for the original Macintosh.

What do you see people using these things for?

The basic thing is messaging. With personal computers, the very essence of them is making documents that are ultimately destined for paper, more or less. Computers are a medium, and it's really limited just by the creativity that the person brings to it, but the Magic Cap devices are very centered on providing a graceful way of communicating.

The telephone's wonderful, and in no sense can we replace it, but we can augment it. The telephone requires your full attention. It's this jarring real-time thing—usually when the phone rings you get a little nervous, you have to shift your thoughts, collect your thoughts, to be able to engage in a dialogue with someone.

I couldn't take a phone call and be talking with you right now, or be in any type of meeting, because the phone preempts my attention. The alternative of writing a little electronic postcard can be done while you're carrying on a conversation with anyone else, while you're listeing to something else; it doesn't demand your full attention.

So we think that's a great way to augment communications and give people this alternative. The etiquette will be different because of the fact that it doesn't require your full attention. The etiquette will say that it'll be okay to send things to people you don't know as well, because it won't bother them nearly so much.

How are you working with third-party developers?

We have about thirty products in the works.

We feel we're working for the customers—we are working for the people who will buy this, but one important way we're working for them is by concentrating a lot on making it a platform and working with the third-party developers. It's very near and dear to our hearts.

It came from our experience at Apple, where we saw time and time again that even though Apple made a brilliant system, it wasn't Apple that came up with the breakthrough applications.

It's fun to make a product, but it's exhilarating to make a platform that takes root. You've done an enormous thing if you can make a great platform that unleashes the latent creativity in people that didn't even know it was there. And I think we did that to some degree with the Mac; Bill with HyperCard kind of had that experience in a smaller sense, it wasn't a whole platform, it was a sub-platform...

But it's very rewarding to empower people.

Do you see that most of your developers are going to come from people who have existing applications on computers, or people who start from scratch with this new paradigm?

Well, there's long term and short term. There's certainly both. In the short term, it'll mainly be people that are already engaged in some kind of activity with computers, because they will be the first ones to see the value. It's easy for them, because they've been doing something similar to it.

Eventually, if they are the only people who are able to produce content, I don't think we will have succeeded, because that's too limiting. We need to refine the tools to the point where an ordinary person who can't even use a Macintosh, much less program one, can supply content in our system. Write a newsletter. Sell something. Set up an electronic market for whatever your business endeavors are. We have to make it as easy for those people as it is to run their store non-electronically.

Suppose somebody is in that position today, doing a stock-quotes letter that they're sending out via fax. And they want to move to this new platform. How hard is it?

They would be a little bit frustrated today. We need to build out the platform.

We actually have two platforms at General Magic, Magic Cap and Telescript, and both of them are sort of nascent at this point. They sort of exist, but barely. The designers see the future in front of them, but we have to build out that future, and it's going to take a few years.

Not just General Magic, but the third parties are important at building those tools. The hardy third parties who can deal with the initial lack of tools can build tools that will pave the road for the subsequent ones, and it'll build on itself.

Some of the fundamental tools probably have to come from General Magic because we're the center of the expertise, but ultimately there will be more tools coming from outside of General Magic, just because the world is a lot bigger than General Magic.

I think it's going in the right direction, it's got a great start, but mostly the

continued on page 101

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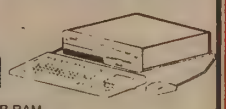

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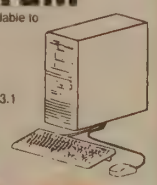

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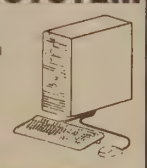

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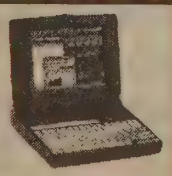

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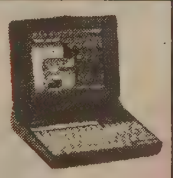

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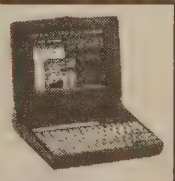

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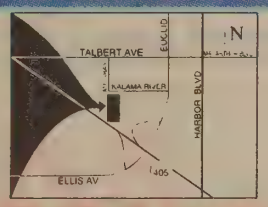

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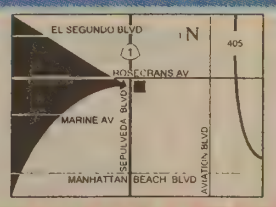

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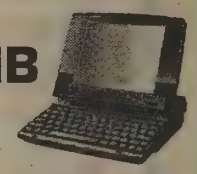

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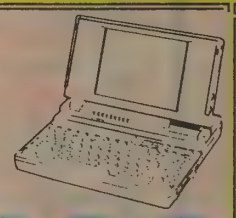

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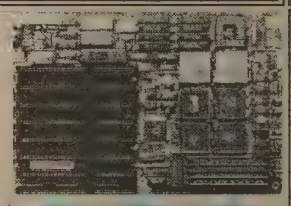

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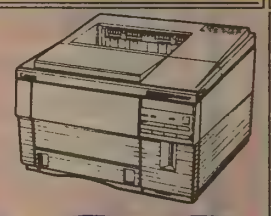

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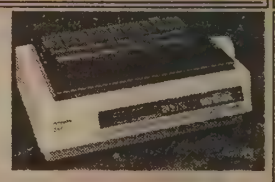

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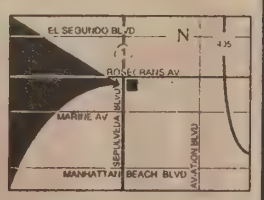

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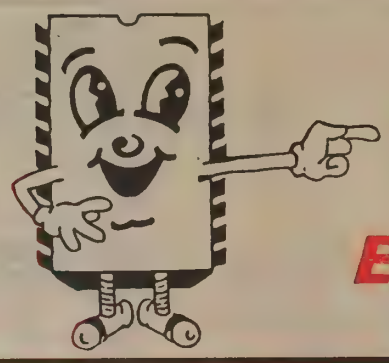

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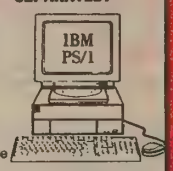

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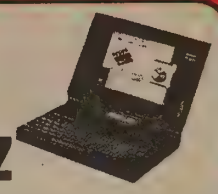

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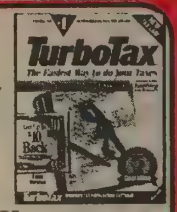

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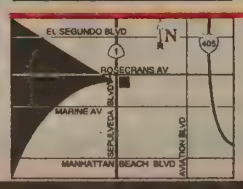

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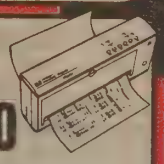

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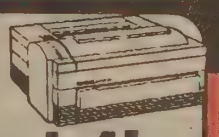

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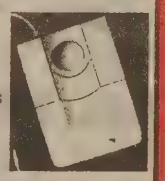

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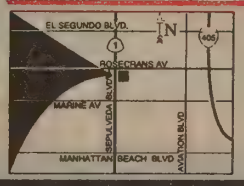

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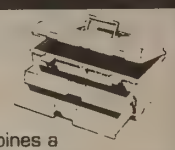

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continued from page 94

adventure is ahead of us.

Sort of like when the Macintosh first came out, you had to write your apps in Lisa Pascal, and eventually you got HyperCard?

That's right. With almost any new platform, I think, you'll see a paucity of tools, a paucity of initial applications. Platforms have to be designed for the future because otherwise they're not worth anything. So it takes a couple years for them to pick up steam.

Some companies have licensed Telescript, some Magic Cap, and some both. What's the differentiation?

Each company brings their own interest.

Telescript—almost everyone is interested in it, because its very nature as a communications standard means ubiquity is essential. No one wants warring comm standards that are similar but different.

But in terms of the device platforms, because they're not fundamentally communicating, they're an operating system for a device, they can coexist. There can be a plethora of different standards.

I would say that whereas most of the companies investing in us are committed to Telescript, only some of them are committed to Magic Cap, because those same companies have other device platforms that they control and they would like to see win over Magic Cap—obviously, Apple with Newton, obviously AT&T and PenPoint are the two that stand out.

Where do you see the devices going?

Oh, in many different directions. I think they'll get both bigger and smaller. There's an obvious need for something you carry around with yourself to be as lightweight and fit into your life as easily as possible, so it has to get smaller and less heavy for that. On the other hand, you'll see some things that are deskbound, the technology will be good in that situation. A postcard answering machine, for example. I think you'll see fax machines go in that direction somewhat, to be able to become sort of almost personal services.

We work hard to help each licensee who adopts Magic Cap to integrate some of their own specialness into the product, some of their core expertise. So you can expect Motorola to explore the area of wireless devices more than others, because that's what they're good at.

This is completely hypothetical, but if we had a licensee like Kodak or Canon, you could expect them to make a Teletouch that was a camera. That would be great.

We want to find licensees who bring something to the party, who have a technology they've mastered that is unique in our mix. We'll encourage them to create a product built around that.

You've said that you essentially decided not to deal with handwriting recognition right now. Why?

It's really very simple—the handwriting technology doesn't work well enough to meet the expectations of the kind of customer we're going after. Perhaps industry cognoscenti who realize how difficult a problem it is can be pleased with the fact that they got it to almost work, but end-users used to flawlessly recognizing a lot of handwriting themselves—they don't understand it's difficult, they just think it's broken.

We had to make this call a long time ago. Bill was really the main one who made the call about four years ago—we had to predict "in four years, will the handwriting be up to snuff?" And as you know, technological years are kind of like dog years—that's like predicting twenty-five years ahead in the mainstream future of the world. That's hard to predict anything out that far. But we made a good call.

The reason it's so hard, and people don't realize this—you're using a great fraction of your entire life experience when you're recognizing handwriting. It's not just recognizing letters, it's what words, what are the surrounding words—common sense.

Is there anything intrinsically incompatible between handwriting technologies and Telescript and Magic Cap?

No, absolutely not.

At the basic level of digital ink, we've embraced the Jot standard proposed by Slate as part of our interplatform content format, so that's how Telescript can carry the ink between platforms. And Magic Cap is extraordinarily extensible, and we expect some of the handwriting companies to integrate, although I don't know of any particular one working on a product right now.

We would only bundle handwriting into Magic Cap when we think it's right for the user, and I would have to say that that's at least a couple years off, if not longer. It's not in the predictable horizon.

The Mac team was a relatively small group of people working in relative freedom from outside pressures, whereas at General Magic you've got to work together with any number of investors and allies pulling you in different directions. How do you deal with that?

Part of what you're talking abut is what we sometimes call General Magic's third technology. Besides Telescript and Magic Cap, we have this technology that Marc is the creator and master of, called alliance management. What that is is, like with any customer, understanding their real needs. Not necessarily what they say, but what are the real dynamics behind the request—does it make sense, etc.

As a little company, trying to establish two platforms, we always will have more tasks than we possibly can do. There are a lot of things we'd like to do that we just don't have the resources to do, but we balance those and try to make the right decisions. In terms of working with these large companies, there's an art to it, basically, which is giving them what they need, but not necessarily what they ask for.

Can you give an example?

There are many different ones where we go round and round about different aspects of it, and basically having goals aligned, having values aligned, is what makes it work. All of the alliances committed to the same dream, and so where there's a will there's a way. So we just discuss it.

Sony has been one of the ones that has helped us the most in user interface design. They have come up with various complaints. One good example was that the text wasn't readable enough on the LCD display. We were using text, sometimes over light grey backgrounds. One of the things Sony encouraged us to do was bold text as much as possible, to make it more readable. They could see what we couldn't, because they were a little bit distanced from it. And then we talked about it. We had initial reservations because we had to think it through, but then we said, "You're right, we'll do it."

Speaking of Sony, what are the international issues you're dealing with, since your investors and licensees are pretty international?

Well, there's a variety of issues. Some of the investments have to be approved by government agencies, and that has occasionally taken a little longer than we'd like. There's various kinds of export restrictions.

Initially we're just trying to make this first wave of products for the North American market, so we don't have the Kanji localization initially, although that's in the architecture, we use 16-bit character codes and all of that. There's also some language problems, in terms, although I must say they're much better than we are. I never talk Japanese to them, their English is a lot better than my Japanese.

Basically I've found Sony to be just a pleasure to work with, again, because I think the values are aligned. They have a certain spirit in their products that I think resonates with what we want to do.

When you were doing the Mac, there was sort of this undercurrent of you were doing it right and the rest of the world, especially IBM, was doing it wrong.

That emerged as more of a marketing thing after the Mac was done. I think it's fair to say that we essentially ignored—we didn't think of the IBM PC as competition for the Macintosh, because it was clearly so inferior, basically. [*laughs*] We weren't looking at that; in no way was it a stalking horse.

We did get one in August of '81 when it came out. Steve was often tight with money, but he approved us rushing out and buying a 64K original IBM PC. We took it all apart.

We just made jokes about it, more or less. The funniest joke I remember was this game it came with called Donkey. It was this horrible low-res graphics game—it was a very clunky car game, and this donkey would appear at the road,

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and if you didn't hit the button at the right time you'd crash into the donkey.

It was so poorly implemented, the whole concept of it was so bad, that we thought it was funny, until—because it was a BASIC program you could list it out, and we listed it out and we saw it was written by Bill Gates himself!

And that made us think it was doubly funny. Not even by himself, Bill Gates and someone else.

Do you have a sense with this project that you're essentially defining something new that nobody's out there doing?

No—well, in some sense. I think we're quite different—as you know, some of the handheld things that are roughly our price point and form factor have been out on the market for almost a year, and some of them are quite legitimate competitors.

I think there's nothing very close to our design center, which is based on communication using realistic, tangible metaphors. The others are all more similar to each other than they are to ours, which use a notepad metaphor, and are essentially in their heart of hearts—even though they might be described differently by the marketing teams—organizers. You can tell just from the basic design.

We're different, and I think there's a lot of spirit in our work that you don't see elsewhere.

I'm impressed by various aspects of the other platforms, and certainly there's room for more than one. I think it's actually good for the industry right now.

I guess it's obvious that the personal computer industry is a little bit weaker by having one standard be too dominant. I think you do want a strong standard, but in my mind the industry would be best if there were always sort of three standards—the one on its way out, the one coming in, and the one in the center. Maybe that one in the mainstream should have something like a 70% market share. That's healthy. Once you get something that's up in the 80–90% range, it starts squeezing out innovation.

That's unfortunate, because computers are so malleable, and semiconductor progress is such that there's so much more memory every four or five years that the rules have to be rewritten.

And I guess that's what's going to save us. I think. It's hard to maintain the hegemony generation after generation.

So what would you like to see devices be able to do for people that they can't now?

Well, for General Magic, one of the things that has to mature the quickest is the wireless technologies. I think that is truly magic—it's a qualitatively different experience, to be able to be connected with the world as you're walking around.

Again, some of that is nascent at this stage. It works only because there are so few customers. And we have the chicken-and-the-egg problem like anything—to build the infrastructure there's got to be customers, and you've kind of got to get the ball rolling. We have this concept of the success crisis that it's possible for General Magic to have—by getting so many people engaged initially, the communications infrastructures will collapse under that weight. And so we have to plan for that.

On the other hand, we have to plan on the opposite happening to us—slow growth and people not investing in the infrastructure enough to make it compelling enough to get the ball rolling. So we have to walk that tightrope.

But I think wireless is an area where a lot's going on, a lot needs to go on, and it's at the very core of the excitement about what we're doing.

Better LCD screen technologies, I think, will also help us. They're okay now, but they're still nowhere close to as good as paper in terms of contrast ratio. It's still the most expensive—it's something like the LCD screen is more than a quarter of the bill of materials of the device. Just one component. So a lot of evolution there will help us get the price down and make a better experience for the customers.

And then, the other thing we need is feedback from the customers. That's really the next threshold for General Magic, is to just get some customers and see what they really think. There have to be thousands of them. We've tested it on hundreds of people, but that's still a very small cross-section of the potential customers. So the next thing for us is to listen to what people have to say about really using it in real situations.

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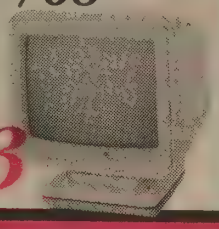

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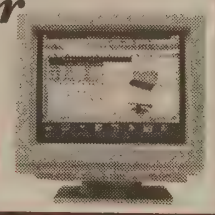

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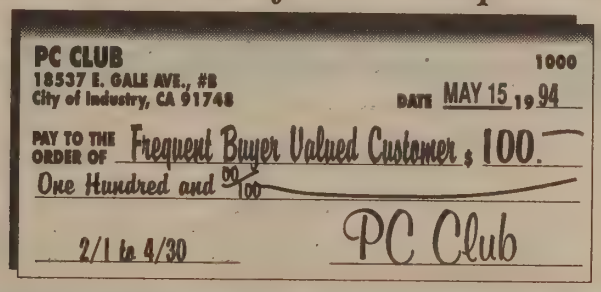

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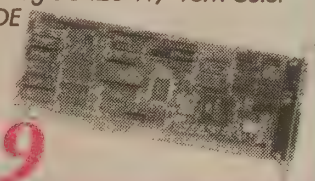

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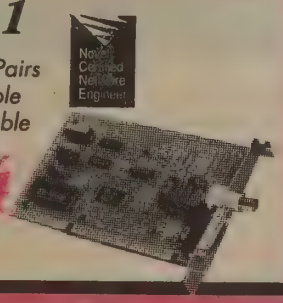

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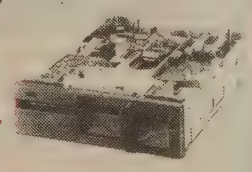

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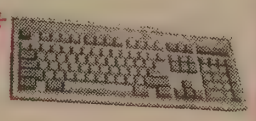

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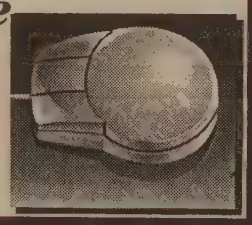

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- 2 - 5 1/4" Bay
- 2 - 3 1/2" Bay

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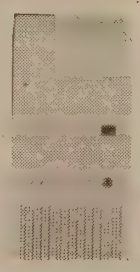

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- Pentium CPU Included

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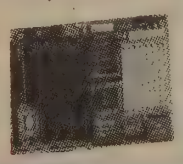

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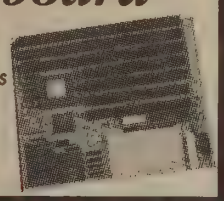
- 256K Cache
- 3 Local Bus Slots



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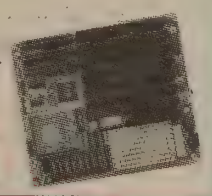
- ZIF #3 Socket for Pentium P24T
- Green Capable



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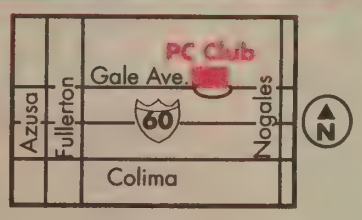

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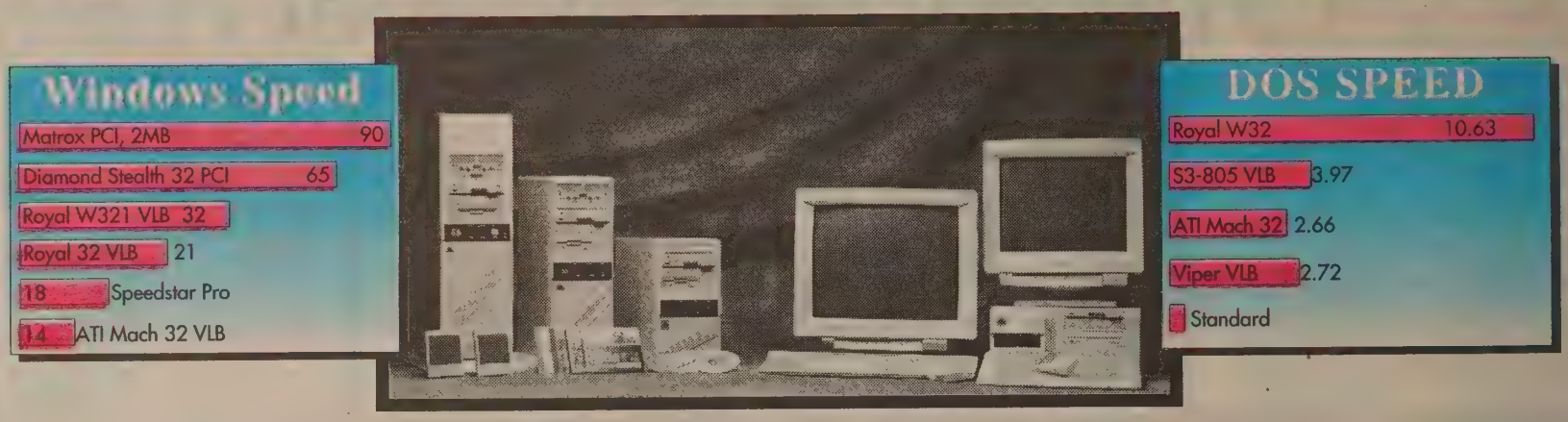

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Pentium 66MHz.....$2790

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- VL-Bus IDE HD Controller
- 420MB 12ms IDE Hard Disk
- Royal 32 VLB 1MB RAM
- 15" Low Radiation Flat 1280 x 1024
- 1.44, 3.5" MB Floppy Disk Drive
- 1.2, 5.25" MB Floppy (Add $45)
- 101 Keyboard, Hi-res Mouse
- 2 Serial, Printer, Game Port
- Mid Tower Case w/Power Supply

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- 1.44, 3.5" MB Floppy Disk Drive
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PCI, EISA, PENTIUM WITH 64 BIT GRAPHICS

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ISA 486 33MHz SX w/CPU	195
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ISA 486 50MHz DX 64K & CPU	525
ISA 486 66MHz DX2 w/64K & CPU	585
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VLB 50MHz DX2 w/128K Cache & CPU ZIF	460
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It only happens once a decade.

10
MICROTIMES
TEN YEAR
CELEBRATION

Coming in **May 1994** watch for an exciting new look wrapped around the same **great editorial** you've found in ***MicroTimes*** **month after month** since 1984.

Join us for a look back on the last ten years in the **computer industry** and a peek at what industry visionaries see coming up in the **next ten**.

Did that happen with the Macintosh?

Oh sure. Well, it didn't have much of a chance to feed back before it shipped, but after it shipped, sure. And of course some people are dogmatic—Steve Jobs has never been great at listening. Neither am I for that matter. It's hard to.

I've been pleased so far at the positive reaction and enthusiasm. People seem to get it when they see it. They see that it's not just another oppressive gadget.

So I'm real excited. But again, it's not the beginning of the journey, it's like we've crossed the first really important threshold. But we've got a ways to go.

I'm surprised. I've been working really hard. I've always worked really hard, and I've been working harder than I've ever worked the last few years—I feel so much responsibility, and it's so worth working on. I'm surprising myself at this point, four years down the road and we're finally showing it to people, that I feel like working as hard as ever this year. It's still compelling me. I'm so excited about what's left to do that I'm working just as hard as ever.

The only way to design a good user interface is to iterate and iterate and iterate. We had a lesson in that at General Magic, just the style of our two teams. We have a comm team doing the Telescript language and the device team doing the operating system and user interface.

The teams had essentially different styles for a very good reason—communication protocols, since they're in agreement between multiple platforms, have to be incredibly rigorously defined, and so what we have to do to design them is kind of get the straw design and then just think about it real hard. Think of every possible alternative. The Telescript team did a lot of meetings without writing code.

On the user interface side, the only way to get something good is to try things out. I have a real feeling of having my hands on the clay—you don't know what it's going to look like, and each step tells you the next step to take. I don't think anyone is good enough at it to do that just in their mind. You really have to see it, and get people in front of it.

So you just take your best idea at the time, and you find victims to inflict it on, and you watch and see where they stumble, and you say, "Oh, there's a stumbling block. How do we get rid of it?"

The users are never going to tell you how to design it. They'll just tell you it's not good enough yet. They'll stub their toe and sprain their ankle on the various rough spots, and then say you'll have to get out your conceptual sander and get rid of that problem.

And of course by getting rid of that problem you could have created another problem. So you just iterate and iterate and iterate, and after literally tens of thousands of attempts, it gets usable.

What did people surprise you by having trouble with?

Just all kinds of things. People didn't understand the navigation initially, when we didn't have the name of the place you were going back to, we just had an icon that meant "step back." It turns out that was too abstract for people, even though I thought it was really clear.

At one time you even had a little stair-step that highlighted the different level of the stairs to show which of the four levels of navigation you were on. It was so clear—and no one had a clue what that was.

Luckily, as Bill says, "There's only one rule to user interface design: Make the user happy." Any other rules you might derive come from that basic principle. So that's what we do. We can't have too much pride in whatever our current design is, because it's almost certainly wrong for some person.

I do believe in giving people multiple paths, because everyone's mind works differently. Jef Raskin used to have something that he called the principle of monotony, which is there should only be one way to accomplish anything. I completely disagree with that. Because everyone brings a whole different lifetime of experience to it, there have to be different doorways for the different types of person.

So we carefully tried to do that. We look where people fell, and we try to get into their frame of mind—what were they thinking? Sometimes we have people kind of muttering under their breath—we encourage them to do that so we get more of a window into exactly what they're thinking. And then we can say, "Oh, I get it, this is their picture of the world, and that's why it's wrong." We just didn't understand someone would think of it that way. So often you could say, "Oh, I see, they're thinking of it that way, we could design it in such a way that both approaches work." Maybe it's a second way of doing things, but more

continued on page 115

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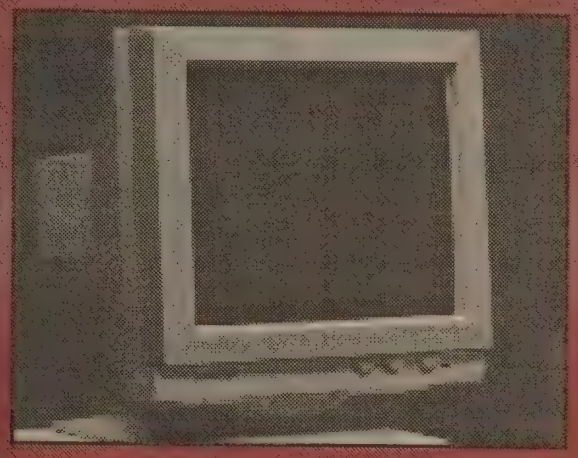

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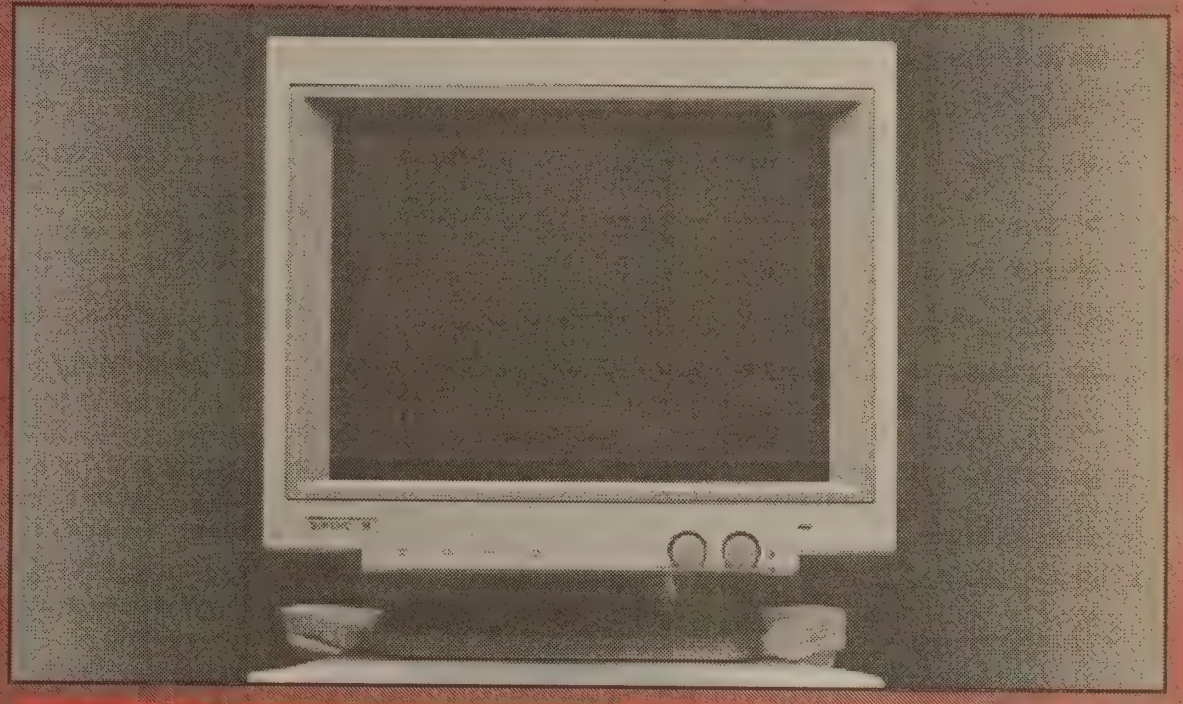

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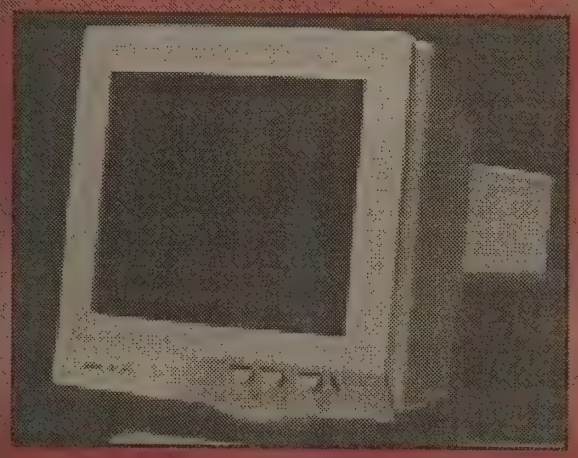

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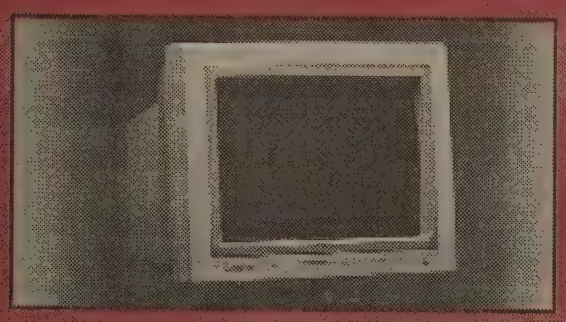

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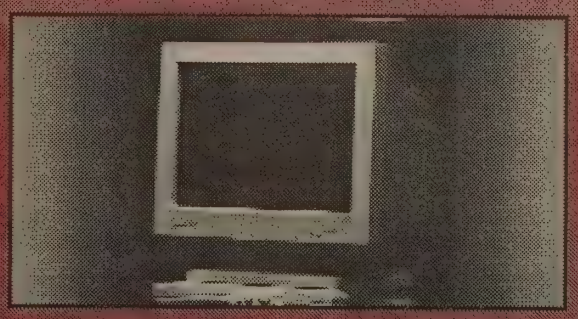

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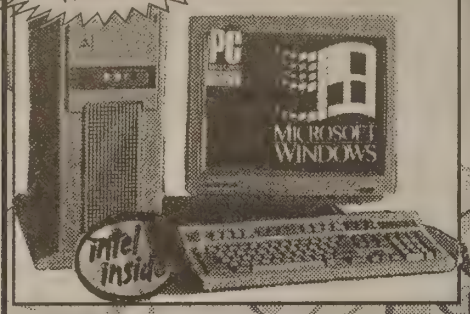

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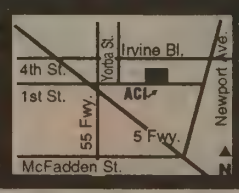

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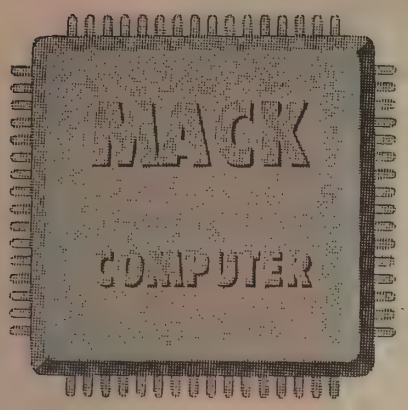

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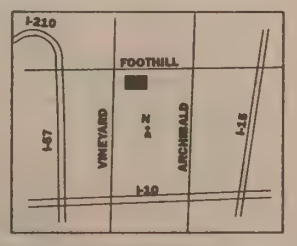

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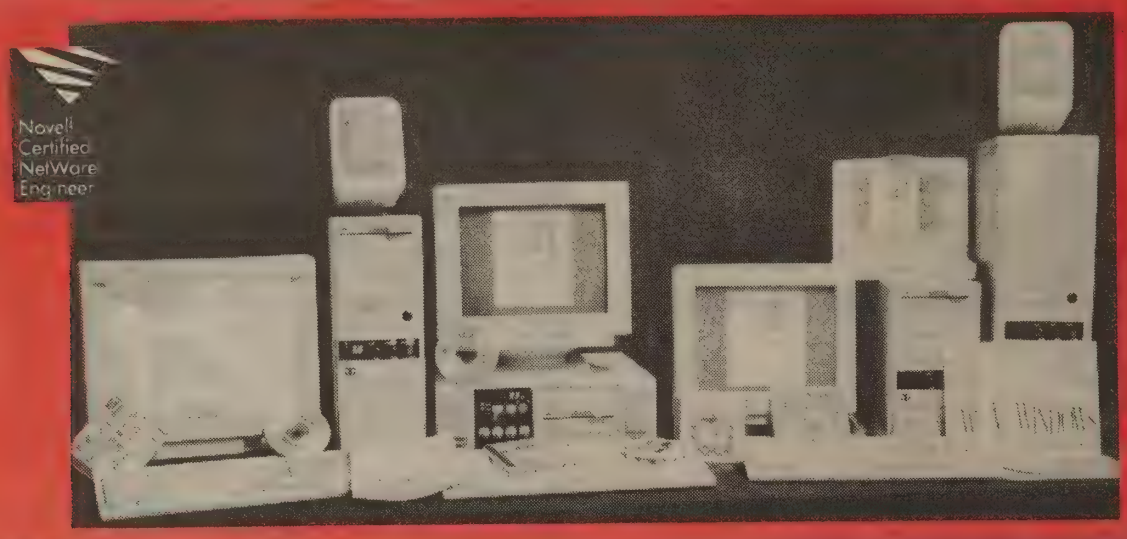

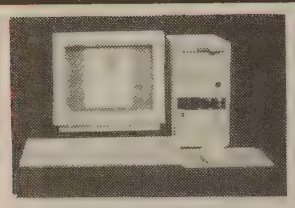

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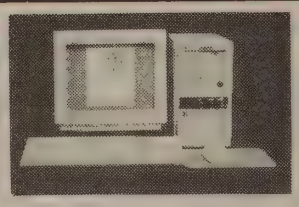
128KB External Cache
4MB RAM at 70ns(expandable to 32MB)
5&1/4" & 3&1/2" Floppy Disk Drive
16 Bit Floppy Drive/Hard Drive Controller
2 Serial/1Parallel/1 Game Ports
Super VGA Monitor, 1024x768, Edge to Edge
Deluxe Mini Tower Case w/230W UL Power Supply
212MB IDE Hard Drive(expandable to 2GB)
16Bit Super VGA Card w/1MB RAM
(HI-Color, Graphics Accelerator)

Great for
Data Processing/Spresheet Program

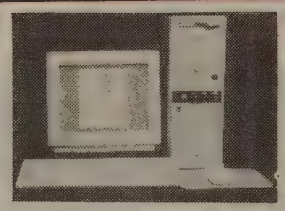


486SX/25

$988 or $33/month

Intel Pentium OverDrive Ready
486SX/25 MHz CPU
External Cache Upgradable to 256KB
4MB RAM at 70ns(expandable to 32MB)
5&1/4" & 3&1/2" Floppy Disk Drive
16 Bit Floppy Drive/Hard Drive Controller
2 Serial/1Parallel/1 Game Ports
Super VGA Monitor, 1024x768, .28dp, Edge to Edge
Deluxe Mini Tower Case w/230W UL Power Supply
212MB IDE Hard Drive(expandable to 2GB)
16Bit Super VGA Card w/1MB RAM
(HI-Color, Graphics Accelerator)

Great for
Video Performance, Versatility



486DX 33/66 EISA / VESA

33MHz -- $1598
66MHz -- $1798

Intel Pentium OverDrive Ready
486DX/486DX2 CPU
256KB External Cache
4MB RAM at 70ns(expandable to 128MB)
5&1/4" & 3&1/2" Floppy Disk Drive
2 Serial/1Parallel/1 Game Ports
Deluxe Middle Tower Case w/230W UL Power Supply
250MB Hard Drive(expandable to 2GB)
32Bit VESA LB Floppy/Hard Drive Controller
32 Bit VESA LB Accelerated SVGA Card w/1MB
(16.7Million Colors,1280x1024)
15" Super VGA, Non-Interlaced Monitor
(1280x1024, .28mm dot pitch)

Great for
Servers & Power Workstation Applications

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The Best for the Educationnt & Home Entertainman

Deluxe MultiMedia Pack:

Panasonic Internal
CD-ROM(390ms)
Sound Blaster Pro Audio Card
Free Speakers
5 CD Titles:
* Toolworks Multimedia Encyclopedia
* Secret Weapons of the Luftwaffe
* Mixed-up Mother Goose
* U.S. Atlas
* World Atlas

$325

Ultima MultiMedia Pack:

Panasonic DOUBLE SPEED
Internal CD-ROM
Sound Blaster 16 Audio Card
Free Speakers, Microphone
7 CD Titles:
* Toolworks Multimedia Encyclopedia
* Secret Weapons of the Luftwaffe
* Mixed-up Mother Goose
* U.S. Atlas, * Loom
* World Atlas
* Tempra Photo CD

$445

Canon Notebook Innova 486NX

* Intel Enhanced 486SX/25MHz CPU
* 4MB Memory, Exp. 12MB
* 9.5" LCD 64 Gray Scale Screen, 640x480
* VGA Accelerator Video Card w/512K RAM (Support Ext. SVGA Monitor 1024x768)
* 120MB IDE Hard Drive
* 9600 Fax/2400 Modem, * Build-in Trackball
* Battery Hours: 2.5 to 5 Hours(NiCad)
* 110-240V Automatic, * 5.9lbs

Software Package Include:
* MicroSoft DOS 6.0
* MicroSoft Windows 3.1
* MicroSoft Works Ver 2.0
* MicroFax by Phoenix

$1545

One Year Road-Side W'arranty

Free *Mouse & Mouse Pad*

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*** All Advertised prices reflect 2% cash discount ****

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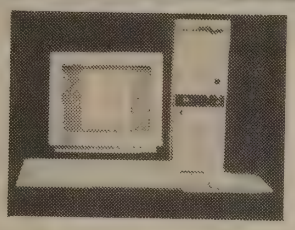
** All Systems come with 1 Year Parts & Labor Warranty.
** Price Subject to change without Notice.

And the Quality You Need"

486 DX, 32 Bit VESA Local Bus System

The Best Buys for Windows & Power Users



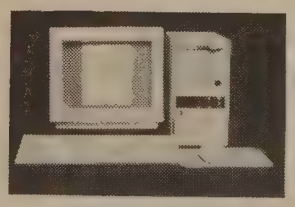
Intel Pentium OverDrive Ready
486DX/486DX2 MHz CPU *(Heat Sink with Fan for DX2/66)*
256KB External Cache
4MB RAM at 70ns(expandable to 128MB)
5&1/4" & 3&1/2" Floppy Disk Drive
2 Serial/1Parallel/1 Game Ports
Deluxe Middle Tower Case w/230W UL Power Supply
101 Enhanced Keyboard
250MB Hard Drive(expandable to 2GB)
32 Bit VESA LB Floppy/Hard Drive Controller
32 Bit VESA LB Accelerated SVGA Card w/1MB (16.7Million Colors,1280x1024)
14" Super VGA, Non-Interlaced Monitor (1024x768, .28mm dot pitch)

486DX/33	486DX/40	486DX2/66
$1278	$1298	$1478
or	or	or
$42/month	$43/month	$49/month

* 345MB IDE Hard Drive +$70
* 425MB IDE Hard Drive +$135
* 545MB IDE Hard DRive +$335
* Diamond STEALTH 24 VESA LB Video Card w/1MB +$85
* ORCHID FAHRENHEIT VESA LB Video Card w/1MB +$95
* Diamond VIPER VESA LB Video Card w/2MB RAM +$295
* 14" VESA Standard, Non-Interlaced Super VGA Monitor, 1280x1024, 70Hz, .28dp +$35
* 15" Flat Screen, Non-Interlaced Super VGA Monitor, 1280x1024, 70Hz, .28dp +$120
* 17" Flat Screen, Non-Interlaced Super VGA Monitor, 1280x1024, 72Hz, .26dp +$525

486 DX, 16 Bit ISA Bus System

The Best Buys for Business & Home Users



Intel Pentium OverDrive Ready
486DX/486DX2 MHz CPU
256KB External Cache
4MB RAM at 70ns(expandable to 128MB)
5&1/4" & 3&1/2" Floppy Disk Drive
16 Bit Floppy Drive/Hard Drive Controller
2 Serial/1Parallel/1 Game Ports
Deluxe Mini Tower Case w/230W UL Power Supply
101 Enhanced Keyboard
250MB IDE Hard Drive(expandable to 2GB)
16Bit Super VGA Card w/1MB RAM (HI-Color, Graphics Accelerator)
14" Super VGA Monitor, .28 dot pitch, 1024x768

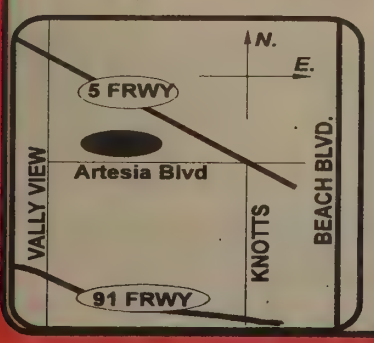
486DX/33	486DX/40	486DX2/66
$1218	$1238	$1398
or	or	or
$40/month	$40/month	$46/month

Special Promotion

MicroSoft Serial New Shape Mouse
$35 Only

14" Non-Interlaced Super VGA Monitor
1024x768, .28dp (Edge to Edge)
$235 Only

K-NET, INC.



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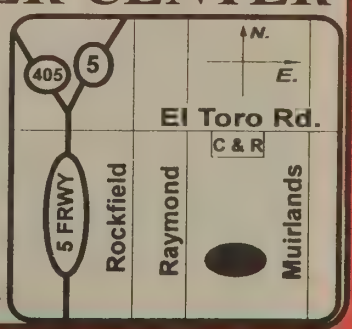

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THINK AHEAD IN '94!

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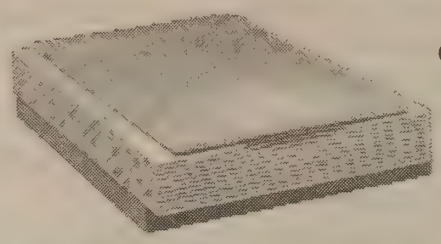
Authorized Dealer

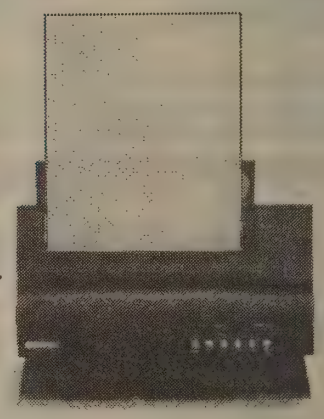
HP SCANJET IIcx SCANNER



Think Ahead! Scanning and document imaging has been made affordable! HP's new ScanJet IIcx is the complete solution for color, grayscale and text scanning. It has an optical resolution of 400 dpi and can process images at up to 1600 dpi with enhanced resolution. It's also equipped with HP AccuPage 2.0 for better text recognition!

$949.00

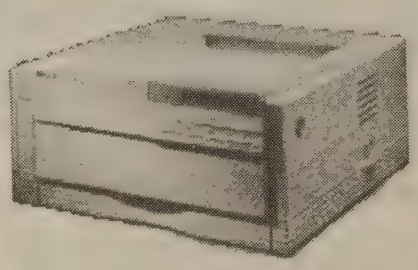
HP DESKJET / DESKWRITER 310 PORTABLE PRINTER



Need something light and compact for printing on the go?! *Think Ahead* to HP's new DeskJet/DeskWriter 310, the best printing companion for your notebook PC or Macintosh PowerBook. It's 3ppm engine prints in black at 300 dpi - with optional color.

$319.00

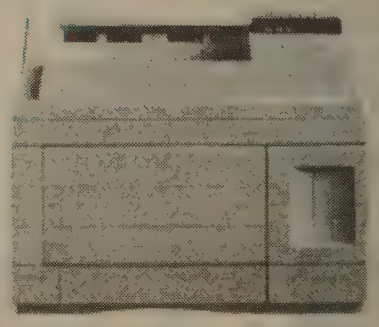
HP LASERJET 4P LASER PRINTER



Think Ahead to 600 dpi printing! The new HP LaserJet 4P prints at a resolution of 600 dpi; that's 4 times the density of normal 300 dpi printers, giving your output a photo-quality sharpness that must be seen to be believed! With 4 page-per-minute(ppm) output and HP's PCL 5 technology, this printer will be with you for a long time!

$949.00

HP LASERJET 4 LASER PRINTER



True 600 dpi technology with a fast 8 page-per-minute(ppm) print engine that prints most 600 dpi documents at 300 dpi speeds. This quickness can be attributed to the LaserJet 4's fast RISC processor and I/O, making printing complex graphics a breeze! Add to this 45 internal scalable typefaces and 2MB of standard memory (expandable to 32MB), and it's easy to see: the LaserJet 4 is *Ahead* of it's time!

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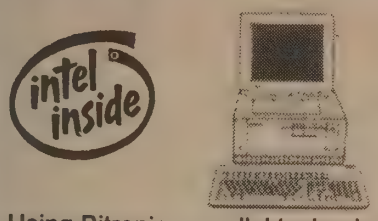
THINK AHEAD IN '94!

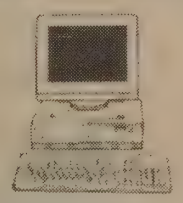
GST PENTIUM/60MHz



Using Bitronics parallel technology and the incorporation of PCI architecture makes this the ultimate Intel machine! Guaranteed to blow you away and put you *Ahead* of the rest!

$CALL!

GST 486DX/50MHz

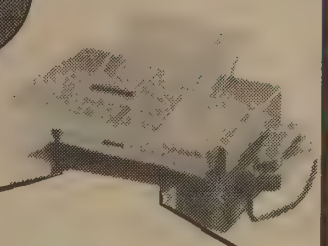


50MHz performance in ISA standard technology! This fully featured unit comes with:

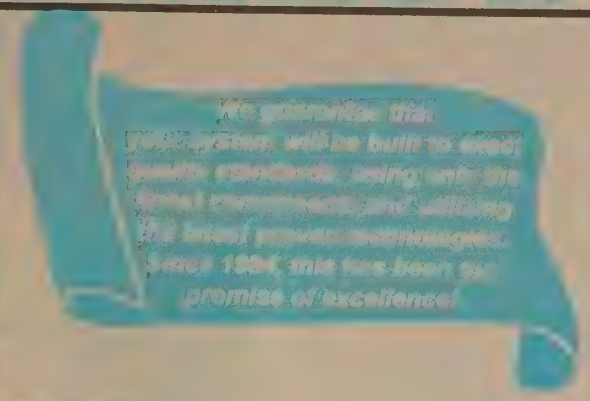
- 4MB RAM
- 245 MB Hard Drive
- 256K Cache Memory
- FDC/HDC IDE Card 1:1
- 1.2M & 1.44M Floppy Drive
- 2 Serial/Parallel ports
- SVGA Monitor .28 w/1MB SVGA Card
- 101 Enhanced Keyboard
- MS DOS 6.2
- MS Windows 3.1
- Mouse

$1639.00!

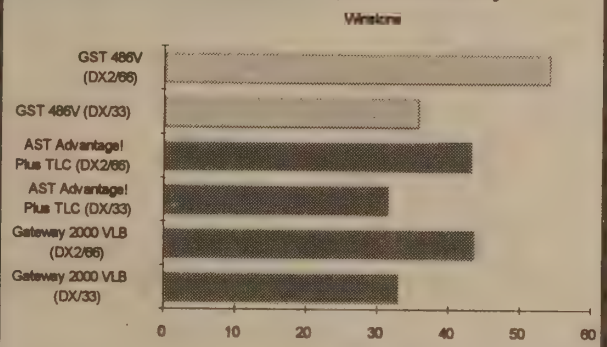
E-Z QUOTE



NEED A QUOTE OR PRODUCT LITERATURE, BUT DON'T HAVE TIME TO STOP IN? FAX US YOUR QUESTION AND WE'LL FAX YOU BACK A RESPONSE!


We guarantee that your system will be built to exact quality standards using only the finest components and utilizing the latest proven technologies. Since 1984, this has been our promise of excellence!

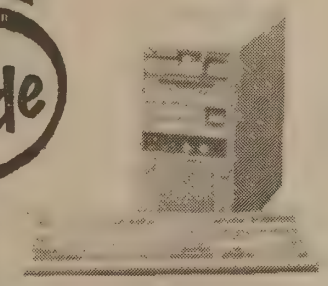
Our GST brand systems are built to handle graphic intensive environments like Windows. Just look at our PC Magazine review and Winstone test ratings! In performance and price, we blow the competition away!



" Priced a bit less than similar units from other vendors, GST 486V models have features and performance that distinguish them as top values."

Overall Value Rating: EXCELLENT

PC Magazine, December 7th, 1993 issue



GST 486 DX/33V

SPECIALLY PRICED BAREBONES UNIT

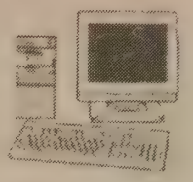
Comes With:

- 486DX/33V w/CPU
- 256K Cache
- VL-BUS IDE Controller w/IO
- 1.44MB Floppy Drive
- Keytronics 101 Keyboard
- Mini-tower case

$899.00

The Intel Inside Logo is a registered trademark of Intel Corporation

GST 486SX/33MHz VESA LOCAL BUS



VESA Local Bus technology improves your video and hard drive speeds compared to ISA bus machines. With upgradability in mind, this is the perfect entry level VESA machine!

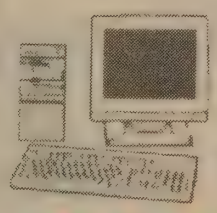
Comes with:

4MB RAM — 64K Cache Memory
VL IDE Controller — 1.2M Floppy Drive
2 Serial/Parrallel ports — Diamond Speedstar Pro Video Card w/1MB — SVGA Monitor .39
101 Enhanced Keyboard

$899.00!

GST 486DX/33MHz

Our Best Seller!
Comes With:

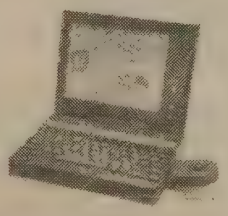


- 4MB RAM
- 130 MB Hard Drive
- 256K Cache Memory
- FDC/HDC IDE Card 1:1
- 1.2M & 1.44M Floppy Drive
- 2 Serial/Parallel ports
- SVGA Monitor .28 w/1MB
- SVGA Card
- 101 Enhanced Keyboard
- MS DOS 6
- MS Windows 3.1
- Mouse

$1399.00!

TEXAS INSTRUMENTS

TRAVELMATE 4000E WINSX/25 *COLOR*



- 486SX / 25MHZ
- 4MB RAM
- 120MB Hard Drive
- ***New advanced color display***
- New high speed video system for fast Windows performance
- Ultra light traveling weight - only 6lbs.
- Improved battery life

$2195.00

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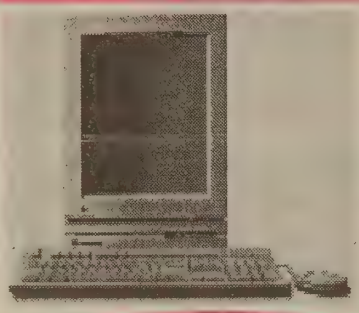


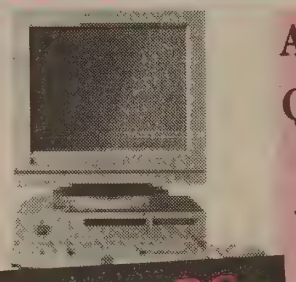
Apple® Macintosh Quadra® 605 4/80

$612*

. 68040 CPU , 25 Mhz
. 4 MB RAM, Expandable to 36
. Built In Video
. A memebr of Modular Mac

*After $200 PCSD rebate with purchase of S-VGA Color Mon. at $499 and ClarisWorks at $199. KB Not Included

Affordable 040 system



Power PC Upgradeable

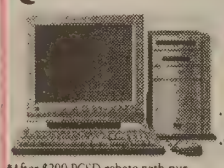
Apple® Macintosh Quadra® 610 8/160

$1049*

. 68040 CPU, 25Mhz
. 8 MB RAM
. Expandable
. Built In Video

*After $200 PCSD rebate with purchase of S-VGA Color Mon. at $499 and ClarisWorks at $199. KB Not Included

Apple® Macintosh Quadra® 840av 8 / 230



$2979*

. 68040 CPU, 40 Mhz
. 8 MB RAM, Expandable
. Speech Technologies
. Integrated Telecomm.

*After $200 PCSD rebate with purchase of S-VGA Color Mon. at $499 and ClarisWorks at $199. KB Not

Apple® Macintosh Quadra® 610 8/230/CD

$1699*

. 68040 CPU, 25Mhz
. 8 MB RAM
. 68882 Math Co-Processor
. Built In Video

*After $200 PCSD rebate with purchase of S-VGA Color Mon. at $499 and ClarisWorks at $199. KB Not

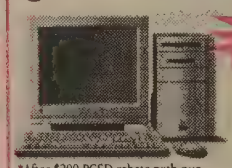
Apple® Macintosh Quadra® 650 8/230

$1973*

. 68040 CPU, 33 Mhz
. 8 MB RAM
. Expandable
. High performance

*After $200 PCSD rebate with purchase of S-VGA Color Mon. at $499 and ClarisWorks at $199. KB Not

Apple® Macintosh Quadra® 800 8/230

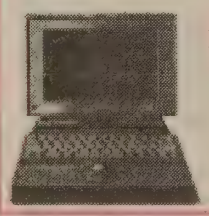


$2262*

. 68040 CPU, 33 Mhz
. 8 MB RAM
. Expandable
. Ideal for business

*After $200 PCSD rebate with purchase of S-VGA Color Mon. at $499 and ClarisWorks at $199. KB Not

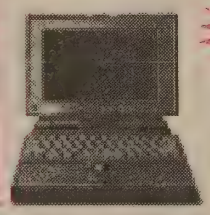
Apple® Macintosh® PowerBook® 145B 4/80



$1186*

. 68030 CPU, 25 Mhz
. 4 MB RAM
. 9.5" LCD Display
. Affordable

Apple® Macintosh® PowerBook® 180 4/80



$1998*

. 68030 CPU, 33 Mhz
. Active Matrix LCD
. 9.5" LCD Display
. Video0ut Port

Apple® Macintosh® PowerBook Duo™ 250 4 MB /200

$2086*

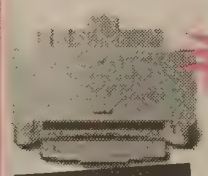
. 68030 CPU, 33 Mhz
. 4 MB RAM
. Active Matrix LCD
. Small & Light

Apple® Macintosh® PowerBook® 180c 4/80

$2299*

. 68030 CPU, 33 Mhz
. 4 MB RAM
. Active Color Display
. 68882 Math Chip

Apple® StyleWriter® II



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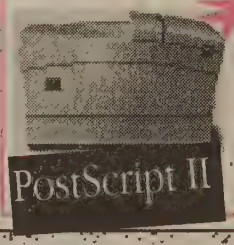
. 39 Scalable —TrueType™ Fonts
. 100 Sheet paper Tray

360 DPI

Apple® LaserWriter Select™ 360



$1449

. 600 Dpi Quality
. 10 PPM
. 7 MB RAM
. 64 Scalable TrueType™ Fonts

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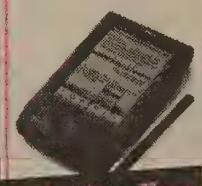

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continued from page 106

Andy Hertzfeld:

"It's fun to make a product, but it's exhilarating to make a platform that takes root. You've done an enormous thing if you can make a great platform that unleashes the latent creativity in people that didn't even know it was there."

often than that it's more conceptually tweaking it.

What's the weirdest thing you can imagine people doing with these things?

That's the same question as "What's the weirdest thing that people do?" And of course that question is more about me than anything else, what I think is weird.

I'm sure there's all kinds of sexual things—as you know, sex has always been a driver to adopting new technologies, and we're in communications, communications is essentially about people, and so there'll be all kinds of stuff in that area.

But I don't think that's weird. It's human and natural. I'm sure if I racked my imagination I could think of weird applications in that area, but I won't even get into that...

"You want agents, we'll give you agents..."

[*laughter*] I don't even know if "weird" is a good adjective. I'm sure there'll be tons of unexpected things, like there were with the Mac. It's just humans. People will take it where their hearts and spirits want it to go.

There's nothing comparable to building a platform, because the platform is this sort of jumping-off point for creativity. I love it.

I think this is my last one, too. It's amazing that we got to do it with the Mac, and when we did it with the Mac we didn't know how hard it was. Whereas with this one we had a pretty good sense of how hard it was, especially for a small company, to develop a new platform, but it was worth doing. I'd be very surprised if I ever found myself trying to do yet another one. It's like, enough is enough! [*laughs*] It's just so hard that you really only get to do it a few times in your life.

And so I'm just going to ride this one out and build as good stuff as I can on top of it.

Do you expect elements of the Magic Cap interface to become cultural icons the way a lot of the Mac symbols did, on T-shirts and bumperstickers and artwork?

That's just like saying, is it going to be successful? It has a lot of personality, and so that will happen if it gets a lot of customers. I sure hope so!

Yeah, but Compaq is successful and you don't see people wearing Compaq T-shirts.

I guess another thing is the kind of people who use our stuff are the kind of people who like to wear T-shirts. [*laughs*] I think that's a much more interesting group of people to go after, than large companies where decisions are dominated by politics, by conservatism. That's not my natural audience.

Free spirits!

In the early days, before there were personal computers, the universities were where programmers almost had to be, and you just look at the type of people there....maybe 20–25% of the pocket protector tie people wore white shirts, but there were much more people with long hair who were just wild, iconoclastic. And there's something about the medium that does that, I think, the sheer malleability of it turns it into an artistic endeavor. ■

Under The Hood: cont.

continued from page 82

PC. You don't know it's there. You don't know how it got there. And it's designed to damage your system in some way, cause you problems, delete your files, interfere with your work, something of that sort.

It's powerful, it's anonymous, and it's damaging to you in some way.

So we've had to address all those three aspects of agents in order to believe that we had a technology that hung together.

The first part of it, power, was addressed by the choice of the language in which the agent is expressed. A virus is expressed in the machine language of the PC, and therefore if it ever does get a chance to execute, it's Game Over, You're Dead; [*laughs*] because it has control of your machine and can do whatever it wants to do.

So we don't give an agent control over anyone's machine in that sense. The instructions from which the agent is created are those of the Telescript language, which isn't the Intel instruction set or the Motorola instruction set or anyone's real instruction set. It's a set of instructions which we've designed to have certain characteristics that provide, for example, insulation of the agent from the physical resources of the computer. So if you've programmed an agent, you have no ability to refer to or manipulate or access in any way the real memory of the computer, the real filesystem of the computer, or any device attached to the computer. All those things are really not in the vocabulary of an agent.

What's to keep the agent from attaching itself to something that does have the right access, a la the Robert Morris worm?

The only two ways the analogous thing could happen in Telescript are, first of all, if the engine were not as I'm describing it, but a faulty implementation, in a way that could somehow expose us to this notion; and we're not aware of it. We don't think that's true.

The only other way that it could happen would be if some particular company was providing a facility to visiting Telescript agents whereby they could supply some binary data and have it run on that machine as native instruction. You could do that, and you'd deserve what you got, I suppose, for doing that.

The second aspect of the virus problem is the anonymity. If I knew that you were the source of the virus that was destroying my computer, well, first of all you probably wouldn't have sent the virus if you thought I could figure out it was you, and even if you did, I'd come get you.

It's the anonymity of the virus which really gives it most of its practical power, and the way we address that analogous concern in Telescript is we don't allow anonymous agents. Every agent has an identity and authority. The identity says exactly what agent in the world it is, and the authority says whose agent it is. So if you send an agent from your personal communicator into the network, it's marked unmistakably as your agent.

Do you use RSA's public-key technology to do this?

Yes, RSA is used to do that in the service that AT&T will offer.

In Telescript every agent has a name. And when one agent encounters another in the network, each can examine the other...

Sniff each other...

They sniff each other, and you can't change your own name, it's as simple as that.

Actually achieving the promise of that simple idea is quite hard, and the best known way to do that is with public key cryptographic techniques, which is what we have done—essentially it involves digital signatures using the RSA crypto system so you can establish, again to the state of the art in computer science, whose agent it is.

I think it's fair to say that with those two aspects —the choice of instructions from which the agent is built, and the authentication of the agent as being your agent or my agent—that addresses what I like to call classical viruses, the kind I described at the outset where you have machine code

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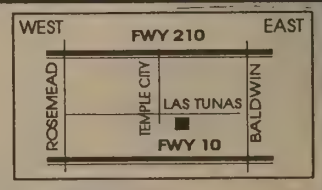

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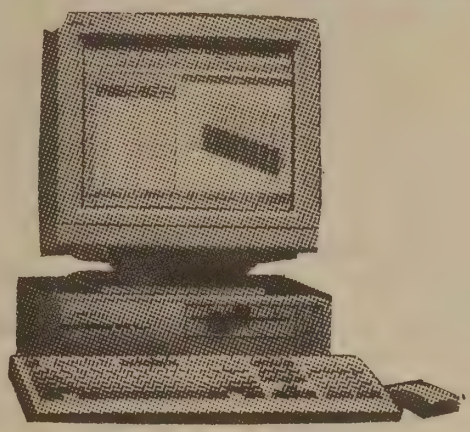

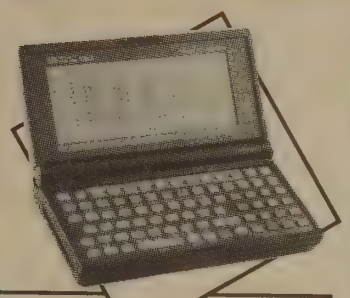

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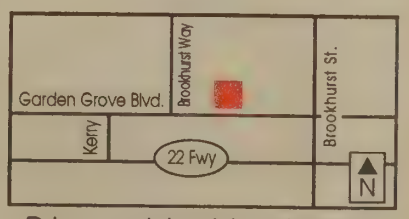

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wandering into your PC.

But now consider that you're creating this electronic universe at a higher level of sophistication, with agents and places and services programmatically accessible. So now you've got to wonder whether there's a higher level kind of virus, a new kind of virus that involves my agent interfering with your agent, or my agent going into an infinite loop in the AT&T computer and sucking it dry of cycles and never really doing anything useful.

There you cannot say things as concretely as I've been saying it at this point. I cannot say that it's impossible to have one of these higher-level viruses, because the problem is you can't say exactly what a higher-level virus is. You can't say what interference means in any precise way, because in many cases your agent and my agent want to be able to find each other and network and interact.

If you have a used car to sell, and I'm interested in a used car of that variety, then if my buying agent could only find your selling agent we'd have a transaction. Of course Telescript has features in it, instructions that allow two agents under certain conditions to find each other and encounter each other and interact with each other—in that example you wouldn't call the interactions an interference. However, if you were sending an agent to an airline ticketing service with the intention of interacting only with that ticketing agent, and somehow I were to send my agent into the same ticketing place and somehow strike up an unwanted conversation with you and delay you, that could be considered interference. The problem is it's very difficult to say, from a tactical standpoint, what's the difference between those two cases.

You can't really say there's no such thing as a higher-level Telescript virus. What you can say is that in Telescript we've thought through what we think are the most important issues like that, kind of safety issues, and we built into the language instructions that are essentially tools that you can use when you're writing an agent, to provide whatever protection you think is appropriate.

So, for example, in this case of agents meeting with each other and interfering, my agent can't meet your agent unless your agent agrees to it. If I attempt to do so, the Telescript engine would say, "Hey, there's some agent with the following name who's trying to make contact with you. Are you interested?" And you can be programmed to always say no to that. There are many tools of this sort in Telescript.

An agent has two things that are really quite important in the safety area. One is the name, who's doing it. The other is the permit—the permit tells what the agent is capable of doing in certain critical dimensions, one of which is how long the agent is allowed to exist. Another is how much money the agent is allowed to spend by its computation. The third is how chubby the agent is allowed to get—measured in bytes, how big can that agent be? And one or two others.

When you create the agent, you specify these things—this is a ten-minute agent, it can grow to be 3000 bytes long and no longer, and so on and so forth. And then all of the Telescript engines in the network that might be hosting that agent at any given moment pay attention to those.

The creator of the agent sets the permit initially. But then furthermore when the agent attempts to move around in the network from place to place, the place it's attempting to enter can say, "Yeah, I'd be happy for you to enter; however, while you're here, you have to limit your capabilities to such-and-such." Maybe it's a one-hour agent, but for the privilege of entering the AT&T PersonalLink part of the network, it only is allowed five minutes and then it has to leave. Or if it hasn't left, it's killed.

If you're operating a service that's going to provide resources to my agent for a period of time, then you have a right to have a say what resources you're going to give to that agent of mine. Because if I'm a malicious user, I might say, "This agent is a one-week agent, and it can get to be 10GB," because I'm deliberately trying to kill the network, that's unsuccessful because the network clamps down on the agent before it happens.

It's not possible to be anonymous, but what about being private? Can people track your agents as they go about their business? Or eavesdrop on the contents of your messages?

There's several aspects to your question.

About eavesdropping on the agents as they're flitting about—as part of our cryptographic security, we also encrypt the agent while it's in transition, using a hybrid scheme involving RSA and DES. It's generally regarded in the industry as computationally too expensive to encrypt large pieces of information in RSA, so you almost have to use someting like DES. You use a hybrid algorithm involving the two schemes.

In transit, while your agent is sleeping, if you were able to tap the line that's carrying the bits, you couldn't make heads or tails in it.

And the same with intercepting wireless transmissions?

Right, exactly the same. That's especially important for wireless. Most people would take the integrity of the phone network for granted, for average uses. But nobody probably should take the integrity of the airwaves for granted.

The issue of monitoring where you shop, what places you're visiting—you can't write an agent that will do that, unless the agents that it's attempting to monitor are deliberately allowing themselves to be monitored. So that same mechanism I was describing, where your agent could avoid interference with my agent, that avoidance of interference goes so far as I can't even tell that your agent is there. So I'd be invisible.

I couldn't write a Telescript agent that would go monitor the activities of all the agents.

Obviously, the place in the network that you're visiting, that you engage in the dialogue with—obviously it can track you, just as the real L.L. Bean can track you when you go into a physical store.

So if you were a hardware or software developer thinking about incorporating Telescript into your products, what do you have to do?

At the moment, there's two cases. One is you're developing for Magic Cap, and that's the way you're doing access to the Telescript technology. That's easier than the other way today, which is to go on some other machine and supply your own user interface. That's kind of a temporary state of affairs, based on the fact that we developed an operating system and a user interface that's Telescript-savvy, the only one today for which that's true.

If you're building for some other platform, then you'd have a tougher go of it, because we don't have all the support structures in place as yet that would help you to develop your Telescript applications.

And also the range of platforms on which Telescript is presently available is very limited. Magic Cap obviously. It's available on various flavors of UNIX, it's not yet available on Windows. We've already done it also on the Macintosh, but we haven't yet productized that. I would say it'll be the fall of this year before we have a pretty good act on these various other platforms.

So for the moment you have to be kind of a pioneering spirit developer, because you won't find the development environment is of the same caliber as it is for a very mature programming language.

It's not like going to Egghead and buying a copy of Microsoft C.

[*laughs*] One of these days hopefully it will be, but it wouldn't be fair to say today that it is. ■

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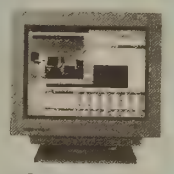
- ***21"***, Full flat screen CRT Invar Shadow Mask
- NEW power save feature
- Microprecessor pic & color control
- 1280 x 1024 flicker-free 72Hz refresh
- Ergonomic standard MPR-II
- 30-78kHz H. scan/ 55-90Hz V. Scan
- 120 MHz Video bandwidth

$2095

NANAO Trinitron T660i

$100 Rebate

- Trinitron ***20"*** screen 0.31mm
- Up to 1664 x 1200 resolution
- 1280 x 1024 flicker-free 70Hz refresh
- Microprocessor control for pic. & color
- Low magnetic & electricfield radiation



$2350

NANAO Flexscan F560i-W

$30 Rebate

- ***17"***, Full flat screen Invar Shadow Mask
- Ultra high resolution, .26 Dot Picth
- 65kHz H.scan frequency with 76Hz high refresh rate for flicker-free 1280 dots x 1024 lines resolution
- Advanced Image Control for automatic picture adjustment and color control
- Low magnetic field and electric field radiation

$1425

NANAO Flexscan F550i

$100 Rebate

- ***17"***, Full flat screen
- Up to 1280 x 1024
- 1024 x 768 at flicker-free 75Hz refresh
- Microprocessor control for pic. & color
- Low magnetic & electricfield radiation

$995

NANAO Trinitron T560i

$50 Rebate

- Trinitron ***17"*** screen 0.26mm
- Up to 1664 x 1200 resolution
- 1280 x 1024 flicker-free 75Hz refresh
- Microprocessor control for pic. & color
- Low magnetic & electricfield radiation

$1675

NANAO Flexscan F550i-W

$30 Rebate

- ***17"***, Full flat screen Invar Shadow Mask
- Ultra high resolution and wide usage with auto-adjusting H. scan frequencies from 30 kHz to 65kHz
- 65kHz H.scan frequency with 75Hz high refresh rate for flicker-free 1280 dots x 1024 lines resolution
- Advanced Image Control for automatic picture adjustment and color control
- Low magnetic field and electric field radiation

$1135

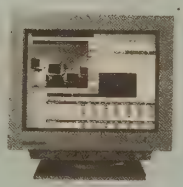
NANAO Flexscan 9080i

- ***16"***, 1280 dots x 1024 lines, Non-interlaced
- 75Hz high refresh, flicker-free 1024 dots x 768 lines resolution
- A microprocessor-based digital control system for automatic picture adjustmentn
- Low frequency magnetic induction and magnetic radiation

$670

NANAO Flexscan F340i-W

- ***15"***, Full flat screen Invar Shadow Mask
- New power save feature
- 1024 x 768 at flicker-free 75Hz refresh
- Microprocessor control for pic. & color
- Low magnetic & electricfield radiation



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The CALIFORNIA COMPUTER The CALIFORN

World-Class Portable Power

Canon

- 486SLC-25 MHz
- 4MB Up to 12MB
- 1.44MB Floppy Drive
- 130MB Hard Disk (190MB Option)
- Bubble Jet Printer Built-In
- Automatic Sheet Feeder Built-In
- PCMCIA - 2 Type II
- 10" LCD VGA Screen
- Canon 2-Button Hand Hold Trackball
- MS DOS 6.0, WINDOWS 3.1
- 4 Hour Battery
- 7.7 Lbs. w/Bubble Jet Printer Inside

Notejet 486
Bubble Jet Printer Built-In Two-In-One!

	135MB	180MB	200MB
MONO	$2335	$2525	
DUAL SCAN COLOR	$2725		$3045

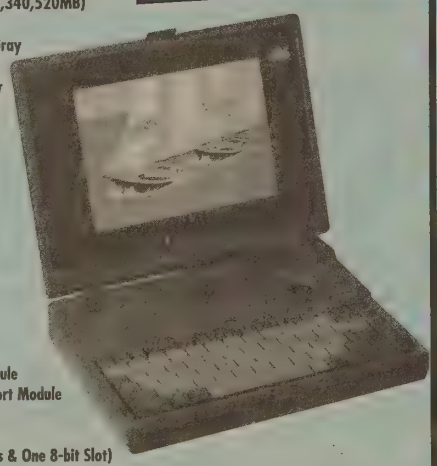
Canon

- Intel 486SX-25
- 4Mb RAM
- 120Mb Hard Disk
- 3.5" 1.44Mb Floppy Drive
- 9.5" Mono Passive LCD 640 x 480, 64 Gray
  9.5" Dual Scan Color Passive LCD 640 x 480
- 1 Serial, Parallel, VGA, Mouse,
  Fax/Modem 9600/2400 (Send/Receive) port
- Build-In Trackball mouse in center
- Weight: 6.3lbs W/battery
- MS-DOS 6.0, Windows 3.1, MS-Works,
  Micro Fax Preload

DUAL-486

Removable Hard Drive

- Intel 486 series CPU (Easy to Upgrade)
- 4MB RAM, Easy to Expand up to 20MB
- Removable 170MB Hard Disk (260,340,520MB)
- 3.5" 1.44MB Floppy Drive
- 9.5" Mono 640 x 480 Backlit 64 Gray
  (Upgradable to Color LCD)
- 9.5" Du-Scan 640 x 480, 256 color
- 9.5" Active 640 x 480, 512 color
- Simultaneous CRT & LCD Operation
- Ports for 1S, 1P,
  Ext VGA Monitor/Keyboard
- Ports for AT expansion box
- 83-Key Keyboard
- Carrying Case & AC/Adapter
- Weight 6 lbs. with Battery
- 11.7"W x 8.4"D x 1.95"H



OPTIONAL MODULE PACK AND OTHER OPTIONS:

- Trackball (Standard) Module
- Fax/Modem (9600/2400bps) Module
- Lan Adapter Module / 2nd Serial Port Module
- PCMCIA* Type II Interface Module
- Scanner Module / SCSI Module
- AT Expansion Box (Four 16-bit Slots & One 8-bit Slot)

	MONO	DUAL SCAN COLOR	ACTIVE COLOR
486SX-33, 4MB/170MB	$1525	$2095	$3055
486DX-33, 4MB/170MB	$1665	$2235	$3195
486DX2-66, 4MB/170MB	$1895	$2465	$3425

NP-800

LOCAL-BUS PCMCIA

- Intel 486DX-33 Upgrade to 66
- 4MB RAM up to 20MB
- 250MB Hard Disk (520MB Option)
- 9.5" Mono 640x480 Backlit LCD
- 9.5" Du-Scan/Active color screen
- Two PCMCIA II Slots or one PCMCIA III
- Built-in Track Ball Mouse, Weight 6.1 lb.
- Carrying Case AC/DC Adapter

	MONO	DUAL SCAN	ACTIVE COLOR
486SX-25 4MB/250MB	$1695	$2245	$3145
486DX-33 4MB/250MB	$1925	$2475	$3345
486DX2-66 4MB/250MB	$2115	$2665	$3575

NP-20

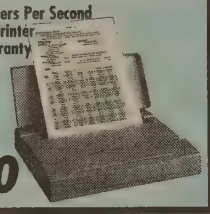
- 4MB Standard Expandable to 8MB
- 120MB HD (200MB optional)
- 3.5" 1.44MB Floppy Drive
- 640 x 480 LCD VGA Monitor
- Rechangeable Ni-Cad Battery
- 86-Key with 12 Function Keys
- 1Serial and 1 Parallel Port, 1PS/2 Mo
- Option for INT. Fax/Modem
- 11"W x 8.4"D x 1.8"H

$1195

Canon

Bubble Jet BJ-10sx

- 110 Characters Per Second
- Laser-Like Printer
- 2-Year Warranty



$240

Canon

The Bigger, Better Budget Minded BJ-230

- Handles A Variety Of
  Paper Sizes Up To 11" x 17"
- Fast Letter-Wide Printing
- 2-Year Linited Warranty

$389

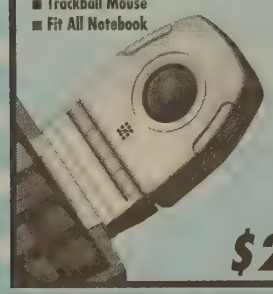
Canon

BJ-200e

- 256 Gray Scale
- 4 Page Per Min., 360 DPI R
- 100 Sheets or 10 Envelopes
- EPSON & IBM Emulation
- 49KB Buffer, Weight 6.6 lbs
- 2 Year Factory Warranty

SUPERTRAK

- Trackball Mouse
- Fit All Notebook



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TOSHIBA

Universal Notebook Carrying Case

$39

Canon

IX-4015 Color Scanner

- 24 bit Color
- 400 DPI x 1200 DPI Hi-Resolution
- 20 Second Color Scanning Speed
  (10 Second For Mono)
- One Year Warranty

New

$995

Canon

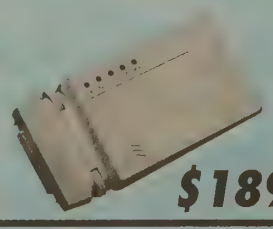
LPB-860 LASER PRINTE

Same as HP 4

- 600 DPI
- 45 Scalable Fonts
- 2Mb RAM up to 34Mb
- 2 Year Warranty

SmartLink

Pocket Size Fax/Modem
14,400 bps



$189

19.2K Ext. Fax/Modem

V.32, V.32bis
V.42, V.42bis
w/NMP5

$215

19.2K Int. Fax/Modem

V.32, V.32bis
V.42, V.42bis
w/NMP5

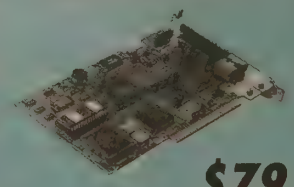
$189

PCMCIA Fax/Modem

$295 --14.4K
$165 --96/2400

Internal 9600/2400 bps Voice Fax Modem

Smart Answering, Smart Fax



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From California Computer

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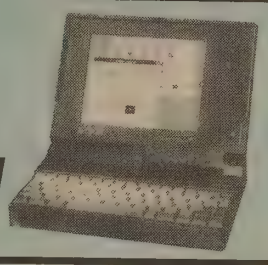
Dual Scan Color

	MONO	COLOR
86SX-25 MB,120MB	$1535	$2150

EPSON 486SLC-33 Sub notebook

PCMCIA

- 4Mb RAM, 1K cache
- Ext. 1.44Mb Floppy Drive
- 80/120Mb Hard Disk Removable
- PCMCIA Type II slot
- 7.5" Mono LCD Passive 640 x 480, 64 gray
- Build-in 2 botton Trackball mouse
- 1 Serial programmable, Parallel, Mouse, VGA, Keyboard Port
- 79/80-key keyboard
- Lightweight: 3.85lbs
- Small: 1.5" x 10" x 7.6"
- MS-DOS6.0, Windows 3.1 Preload
- One Year Road Serivce In U.S.



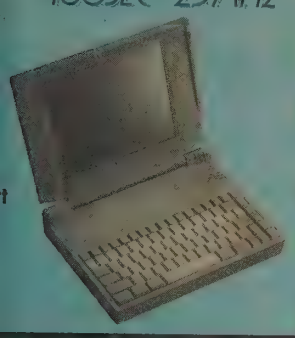
$Call

EPSON ActionNote 4SLC/33

- 486 SLC/33
- 4Mb RAM, 1K cache
- 1.44Mb Floppy Drive
- 80/120/180Mb HD
- 10" Mono LCD Passive 640 x 480, 64 gray
- Logitech Trackman Trackball Mouse
- 2 Serial programmable, Parallel, Mouse, VGA, Keyboard, Fax/Modem Port
- 79/80-key keyboard
- Lightweight: 5.5lbs
- Small: 1.5" x 10" x 7.6"
- MS-DOS6.0, Windows 3.1, WinFax Lite & BitCom Preload
- One Year On-Site Service In U.S.

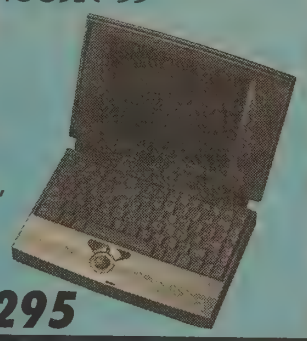
$1555

486SLC-25MHz



NP-602 486SLC-33

- 4Mb RAM, 64K cache
- 1.44Mb Floppy Drive
- 120Mb HD Removable
- 10" Mono LCD Passive 640 x 480, 64 gray
- Build-in Trackball Mouse
- 1 Serial, Parallel, Mouse, VGA(800 x 600), Keyboard, Port
- 83-key keyboard
- Lightweight: 5.5lbs
- Demensions: 8.7" x 11.1" x 1.65"



$1295

PRO-5000 LOCAL-BUS

PCMCIA

- Intel 486SX-25 upgradable 486DX2-66
- 4Mb RAM up to 32Mb
- 3.5" 1.44Mb Floppy Drive
- 200Mb Hard Disk (Removable) up to 340Mb *
- Build-in Trackball mouse in center
- PCMCIA Type III Slot
- 2 Serial, 1 Parallel, VGA, Mouse Keyboard, Docking Port
- 9.5" Mono/Du-Scan/Active 640 x 480 , 64 Gray Ext. 1024 x 768 W/1Mb RAM
- Weight: 5.8lb W/battery
- MS-DOS 6.0, Windows 3.1 Preload

Upgrade to 520MB $450
Upgrade to 340MB $150

	MONO	DUAL SCAN	ACTIVE COLOR
486SX-25, 4MB,250MB	$1660	$2195	$3225
486DX-33, 4MB,250MB	$1856	$2395	$3415
486DX2-66, 4MB,250MB	$2045	$2585	$3595

LASER QUALITY BUBBLE JET PRIC

New

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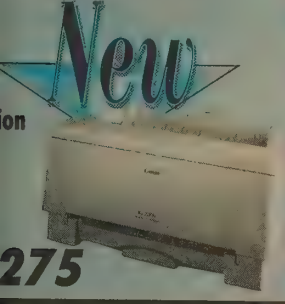


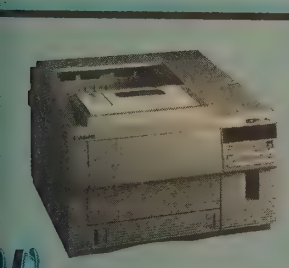
275

Canon BJC-600 PERSONAL COLOR PRINTER

New

- Prints 360 dpi on Plain Paper for Brilliant Color Quality
- Doubles as a Laser Quality, Black & White Printer
- Individual Ink Cartridges
- 100 Sheet Feeder for Letter, Legal, Envelopes
- 20 Scalable True Type Font
- 2 Year Warranty

$579

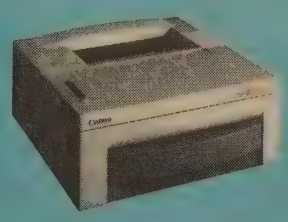


$1315

Canon LBP-430 LASER PRINTER

Same as HP 4L

- Energy Saving
- 22 Fonts (8 Scalable)
- 1Mb up to 5Mb
- 2 Year Warranty



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Pocket Ethernet Adapter

Combines 10 Base-T & 10 Base-2

$165

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The CALIFORNIA COMPUTER

All systems come with 245 MB hard drive, 4 MB RAM, TEAC 1.2 & 1.44 MB folppy drives, 14" SVGA monitor 0.28mm Non-Interlaced, VESA Local-Bus SVGA card, Local-Bus IDE I/O with 2 serial, 1 parallel ports, Mini-Tower case, 101-key keyboard, Serial mouse and Upgradeable 238-pin ZIF CPU Over-Drive socket.

486DX2 VLB66	486DX2 VLB50	486DX VLB33	486DX ISA33
$1455	$1295	$1235	$1185

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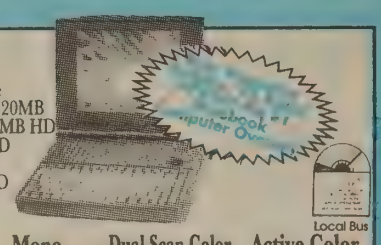
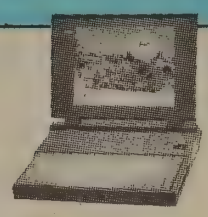


Intel 486 CPU w/8K Cache
4MB RAM Exp. to 8MB or 20MB
2.5" HD 120/200/340/520MB HD
Local Bus Display & IDE HD
PCMCIA Type III
10" Mono or 10" Color LCD
Built-in Trackball Mouse
Microsoft DOS 6.2

250MB HDD	Mono	Dual Scan Color	Active Color
486SX-25	$1540	$2090	$3020
486DX-33	1740	2290	3220
486DX2-50	1770	2320	3250
486DX2-66	1940	2490	3420

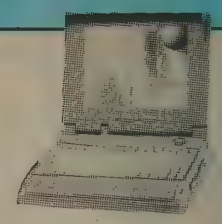
200MB HDD .....
340MB HDD .....
520MB HDD .....
4/16MB RAM Card .....
Docking Station .....



Intel 486 CPU w/8K Cache
4MB RAM Exp. to 8MB or 16MB
2.5" HD 120/200/340/520MB HD
3.5" FD 1.44 FDD
PCMCIA Type III
10" Mono or 10" Color LCD
Built-in Trackball Mouse
Microsoft DOS 6.2

250MB HDD	Mono	Dual Scan Color
486SX-25	$1450	$2015
486SX-33	1500	2065
486DX -33	1665	2230
486DX2-66	1865	2430

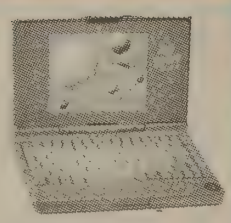
200MB HDD .....
340MB HDD .....
520MB HDD .....
4, 12MB RAM Card .....
Docking Station .....



Intel 486 CPU w/8K + 128K Cache
4MB RAM Exp. to 8MB, 16MB or 20MB
2.5" HD 120/200/340/520MB HD
Local Bus Display
PCMCIA Type III
10" Mono or 10" Color LCD
Built-in Trackball Mouse
Microsoft DOS 6.2

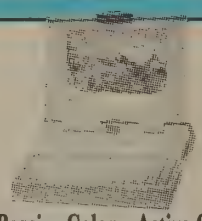
250MB HDD	Mono	Dual Scan Color	Active Color
486SX-25	$1575	$2125	$3055
486DX-33	1775	2325	3255
486DX2-50	1805	$2155	3285
486DX2-66	1975	2525	3455

200MB HDD .....
340MB HDD .....
520MB HDD .....
4, 12, 16MB RAM Card .....
Docking Station .....



Cyrix 486SLC-33 or Intel 486SX-25
4MB RAM Exp. to 8MB or 20MB
2.5" HD 80MB or 120MB
3.5" FD Ext. FDD
Math Co-Processor Options
8.5" Mono or 8" Color LCD
Built-in Trackball Mouse
Microsoft DOS 6.2

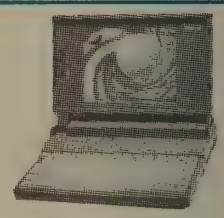
	80MB	120MB
486SX-25 Passive Color	$1830	$1865
486SLC-33 Mono	$1390	$1425
4,16MB RAM Card	$210/$295	
Docking Station	$185	



Intel 486 Serial CPU
4MB RAM Exp. to 16MB
3.5" HD 120/200/340/520MB HD
3.5" FD 1.44 FDD
AT-Bus I/O for Docking
10" Mono or 8.5" Color LCD
Built-in Trackball Mouse
Microsoft DOS 6.2

250MB HDD	Mono	Passive Color	Active Color
486SX-25	$1470		
486DX-33	1530	$2100	$2930
486DX2-50	1550		
486DX2-66	1730	2300	3130

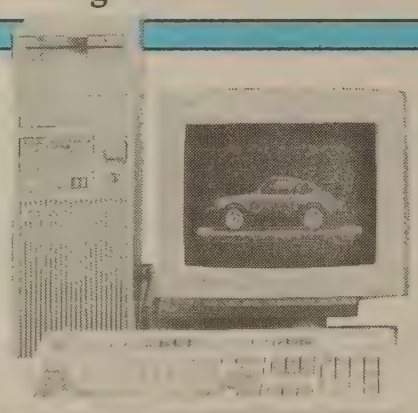
200MB HDD .....
340MB HDD .....
520MB HDD .....
4/12MB RAM Card .....
Docking Station .....



386 or 486 CPU Available
4MB RAM Exp. to 8MB or16MB
2.5" HD 120/200/340/520MB HD
3.5" FD 1.44 FDD
Math Co-Processor Options
9.5" Mono or 8.5" Color LCD
Two Battery Packs
Microsoft DOS 6.2

250MB HDD	Mono	Passive Color
486SLC-25	$1470	
486DX-33	$1550	$1900
486DX2-66	1751	2180

200MB HDD .....
340MB HDD .....
520MB HDD .....



ISA System

- 128K Cache
- 1MB RAM
- 1.44 FDD
- 120MB HDD
- SVGA Card 512K
- .39 SVGA Monitor
- Mini Tower Case
- 230W Power Supply
- 101 Keyboard
- Mouse

Upgrade 486 Socket Ready!

VESA System

- 256K Cache
- 4MB RAM
- 1.44FDD
- 120MB HDD
- V/L Bus IDE I/O
- VL Bus SVGA Card 1MB
- .39 SVGA Monitor
- Mini Tower Case
- 230W Power Supply
- 101 Keyboard
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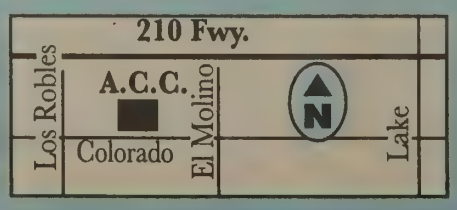

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PRODUCT SPOTLIGHT

New Products

PC Hardware

IMAGE M-LINE 486

Based on the MPC2 multimedia standard, the M-Line series combines high-performance hardware with a broad spectrum of software support. Built around a 486 ISA/VL-Bus architecture (upgradable to the Pentium P24T processor) and VESA-standard local bus Super VGA, these systems are capable of displaying full-motion video and animation with ease. CD-quality sound playback and recording is provided by Media Vision's Pro Studio 16 16-bit sound card, microphone, and stereo speakers. The base configuration includes 250MB hard drive, 1.44MB floppy drive, 14" ViewSonic 6E SVGA monitor, Logitech Dexxa serial mouse, 101-key enhanced keyboard, Toshiba CD-ROM drive. The DOS/Windows configurations include 8MB of RAM; OS/2 2.1 systems include 16MB of RAM. Bundled software features PFS:Works v2, Sound Impressions, Monologue 16 for Windows, ExecuVoice voice control software, and more. (M-Line 486DX2-66M, Windows model is $2955; OS/2 model is $3195) Image Microsystems, Inc., 10700 Santa Monica Blvd., #4-312, Los Angeles, CA 90025. (310)815-1000.

UPDATES

RECALL

NEC has recalled its **PC-17-01** and **PC-17-02** Ultralite computer laptops. These models, sold between December of 1988 and April of 1990, contain defective batteries that can cause explosion or fire. Call: 1-800-237-2913.

UPGRADE

✥ **ACI** shipped **4th Dimension 3.1** and **4D Server 1.1**. Upgrades are free to users who purchased 4D or 4D Server on or after October 15, 1993. Other users can buy the 4D 3.1 upgrade for $59, the 4D Server upgrade for $149. ACI US, Inc., 20883 Stevens Creek Blvd., Cupertino, CA. (408)252-4444.

✥ **Claris** released **MacWrite Pro v1.5**. Registered MacWrite Pro owners can upgrade for $29. Purchasers of MacWrite Pro v1.5 before March 31, 1994, can select one of three complimentary bonus software packages. Claris Corp., 5201 Patrick Henry Dr., Box 58168, Santa Clara, CA 95052-8168. (408)987-7000.

✥ **CoSA** shipped **After Effects 2.0 Professional Version**. Registered users who purchased After Effects 1.x through CoSA or a CoSA reseller can upgrade for $395 until March 1, 1994. Registered users who received After Effects 1.x bundled with SuperMac's Digital Film can purchase v2.0 for $995 until March 1. CoSA, 14 Imperial Pl., Ste. 203, Providence, RI 02903. (401)831-2672.

✥ **CoSA** shipped **Effects Pac vol. 1, v2.0** and **Free Effects**. Designed to work with After Effects 2.0, they are available free of charge to registered users of that software. The cost of Effects Pac vol. 1, v2.0 and Free Effects is otherwise $199. CoSA, 14 Imperial Pl., Ste. 203, Providence, RI 02903. (401)831-2672.

✥ **Gazelle** released **Back-It for Windows 2.0**, which retails for $79. Gazelle Systems, Inc., 305 N. 500 W., Provo, UT 84601. 1-800-786-3278.

✥ **Intuit** announced a new trial edition of **Quicken for DOS**, **Windows**, and **Macintosh**. The cost is $8. Intuit, PO Box 3014, Menlo Park, CA 94026-3014. 1-800-624-5071.

✥ **Masterclips** announced **Masterclips—The Art of Business v2.0**. Masterclips, Inc., 5201 Ravenswood Rd., Ste. 111, Ft. Lauderdale, FL 33312. 1-800-899-7440.

✥ **Micrografx** shipped **ABC FlowCharter 3.0**. Registered users can upgrade for $99 per copy. ABC FlowCharter is available for a limited time for a retail price of $199.95. Micrografx, Inc. 1303 E. Arapaho Rd., Richardson, TX 75081. (214)234-1769.

✥ **Opcode** released **Vision 2.0**. Upgrades from any earlier version of the software are available for $99.95. Opcode Systems, Inc., 3950 Fabian Way, Ste. 100, Palo Alto, CA 94303. (415)856-3332.

✥ **Ray Dream** shipped **Ray Dream Designer 3.0**., which is available at a retail price of $349. Ray Dream, Inc., 1804 N. Shoreline Blvd., Mountain View, CA 94043. (415)960-0768.

✥ **Softool** announced **CCC/Manager 2.1 for OS/2**. Softool Corp., 340 S. Kellogg Ave., Goleta, CA 93117. (805)683-5777.

✥ **TeLeVell** released **TeleSell 4.0**, which costs $199 for single users and $2495 for multi-users. TeLeVell Inc., 1629 S. Main St., Milpitas, CA 95035. (408)956-0511.

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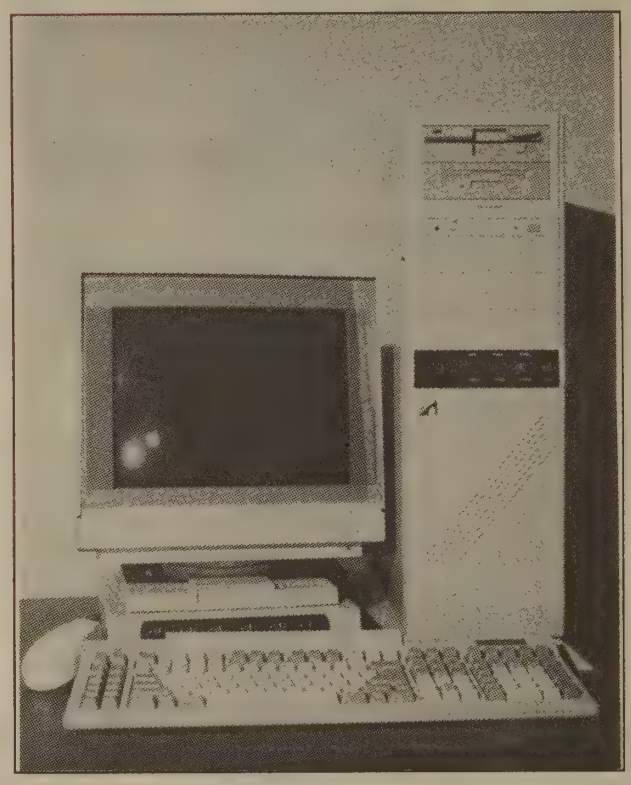
PRODUCT SPOTLIGHT

ANTHURIUM PENTIUM/PCI CADD STATION

Rich in features important to the power user, the Pentium-based Anthurium CADD Station offers speed and flexibility. The basic system's performance is typically twice that of a 486DX2-66, and with the redesigned floating point unit of the Pentium, math intensive applications can run up to five times faster. Other features include the microCRYSTAL 16Si PCI video adapter, NCR PCI SCSI II controller, and Fujitsu 525MB SCSI hard drive. The systems super-tower case has three 64-bit PCI expansion slots and five ISA slots. Anthurium provides a two-year warranty and lifetime technical support, including labor and one-year on-site servicing. (CADD Station P5-60, $3199) Anthurium Technology, Inc., 16371 Gothard St., #D, Huntington Beach, CA 92647. 1-800-PCI-0210.



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SampleCell II is a 16-bit, 32-voice sample playback card for the Windows PC platform. It provides an easy-to-use, powerful, and cost-effective sample player for music and audio postproduction. A basic SampleCell II system features dynamic digital filtering and eight polyphonic analog outputs. Also included are two CD-ROM sound library discs with over 650MB of ready-to-load instrument samples and sound effects. Each card supports up to 32MB of RAM. ($1495, RAM not included) Digidesign, Inc., 1360 Willow Rd., Menlo Park, CA 94025. (415)688-0600.

NEC MULTISPIN 4X PRO CD-ROM

The MultiSpin 4X Pro CD-ROM drive is a high-performance external reader for use in development and professional applications. With data transfer rates four times those of single-speed drives, it provides the smoothest digital animation and video available, as well as the ability to handle complex and intricate applications. It is compliant with Multimedia PC Level 2, QuickTime, XA Ready, and Kodak Multisession PhotoCD standards. NEC's Music Sensor also gives users the ability to play audio CDs. Included with the drive is a switchable dual SCSI 2/SCSI 1 interface port for enhanced compatibility and easy peripheral daisy chaining. In addition, an automatic lens cleaning system and the ability to be used in a vertical or horizontal orientation make the MultiSpin 4X Pro self-maintaining and practical. It is compatible with DOS, Windows, and Macintosh environments. ($995) NEC Technologies, Inc., 1255 Michael Dr., Wood Dale, IL 60191. (708)860-9500.

Continued on page 131

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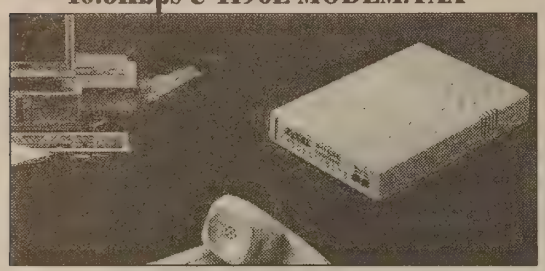

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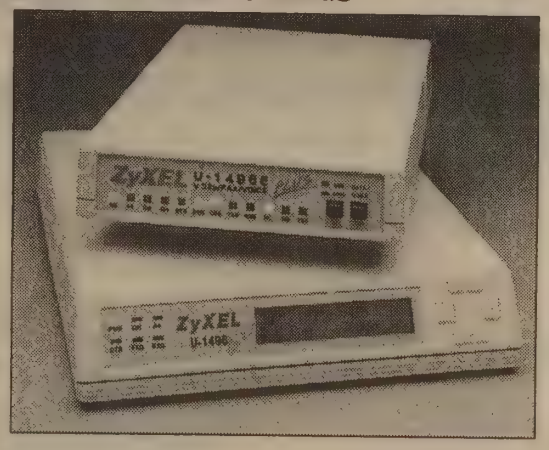

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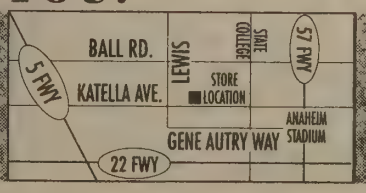

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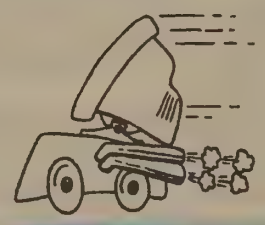

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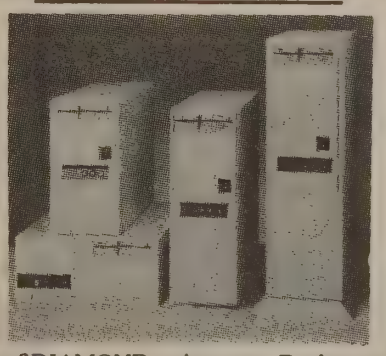

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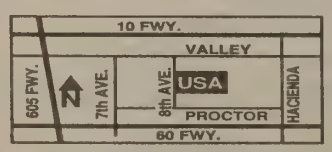

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Continued from page 124

REVIEWS

Game Reviews

DUNGEON HACK

Designed By: Tom Holmes
Produced By: Dreamforge Intertainment
Published By: Strategic Simulations
For: MS-DOS 386/486 (2MB RAM; VGA graphics; Microsoft mouse; sound: Sound Blaster Pro+Adlib+Roland)
List Price: $49.99
Reviewed By: Fred Haslam

Welcome to the Hero Motel. The heroes go in, but they don't come out.

Dungeon Hack is the latest maze game released by SSI. It should not be confused with the legendary shareware game Hack, although there are similarities. Both are maze games with monsters, magic, and mysteries; and both ask you to find an Orb at the bottom (hmm). But Dungeon Hack uses 256-color, real-time, point-of-view graphics whereas the original Hack used the ASCII character set. Also, this new Hack has high-quality music, voices, and sound effects. If you hear a sound like someone clearing his throat, that means there is a monster nearby.

The dungeon is built using the Advanced Dungeons & Dragons role-playing system, although no actual role-playing occurs. The game consists solely of killing monsters, gathering treasures, and figuring out which key to use on which door. I like this type of game. Both Dungeon Master and Ultima Underworld have done this very well. It is done a little more weakly by Dungeon Hack.

The main advantage of this new game is its random dungeon generator. Master and Ultima have fixed dungeons. The randomizer gives you more variety, but the fixed dungeons tend to have more clever puzzles and layouts. Dungeon Hack claims to generate *four billion* different mazes. An impressive number until you examine it closely. A good approximation of four billion is two to the thirty-second power. In other words, there are thirty-two things that change from level to level. On the average this means sixteen things have changed. Not quite as impressive.

The interface is nicely intuitive. I was able to figure out everything for myself. I made a few mistakes trying to use things without putting them into my characters' hands, but I resolved that problem quickly. Despite the jerky animation, the artwork is quite attractive. The floors, doors, and walls have a number of amusing themes; while a variety of tapestries, sconces, and murals break the tedium of moving through repetitive corridors.

As a dungeon game, Dungeon Hack is competent but not great. While I expect characters to die in a dungeon game, I had four characters starve to death before one managed to gain a single level. I played that character for two solid hours before getting to the next level. This was not a very satisfying time/reward ratio. Somehow, the original Hack conveyed more personality with 256 characters than Dungeon Hack does with 256 colors. If you happen accross that shareware classic, give it a try. (Strategic Simulations, Inc., 675 Almanor Ave., Ste. 201, Sunnyvale, CA 94086. 408/737-6800)

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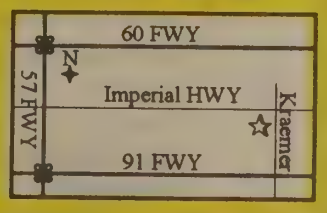

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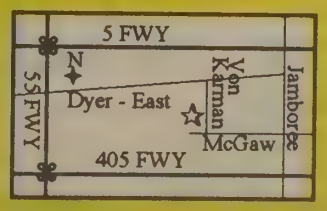

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Reviewed By: Fred Haslam

In space, no one can hear you plead.

Master of Orion is a sophisticated strategy game of interstellar conflict. Like most space strategy games this has exploration, production, research, ship design, and combat. This differs from most space games in its use of alien powers, detailed diplomacy, and computer personalities. Together with a robotic Walter Cronkite delivering the galactic news, these differences make Master of Orion a better than average wargame.

There are ten alien races, each with its own graphics and racial abilities. Humans have a bonus with diplomacy, while the Psilons are masters of research and the Bulrathi excell in ground assaults. The powers are both balanced and unbalanced in a paper-scissors-stone effect. Human diplomats keep them out of conflicts that would bury another race. Bulrathi are excellent in the short term, but Psilons will dominate given time to develop technology.

Diplomatic negotiations can keep you out of wars or get you into them. It's relatively easy to convince another race to join you in an attack, but difficult to get them to ally with you. By negotiating trade agreements, two races can improve both their economies. Long-term trade agreements tend to bring two races closer together since they both have more to lose if they go to war. You develop a history with your opponents—they will not forget a betrayal, nor will they forget timely aid.

This last statement is not entirely true. The computer foes have a variety of personalities. Some are erratic, switching from best friend to deadly enemy on a whim. Others are honorable, xenophobic, calculating, and opportunistic. Espionage can give you some idea of the attitudes and goals of your opponents. Between personalities, opportunities, mistakes, and random events, the diplomatic landscape can become a constantly shifting kaleidoscope. That's entertainment!

The interface for Master of Orion is strongly intuitive. I had some trouble learning to use the production ratio bars, but the online tutorial helped me to figure things out rapidly. The sound and music are solid, but nothing exceptional. The game remained silent when I planned my turns, a fact I appreciated. Graphics are quite good, especially the art for the various races. There was minor animation only.

As a strategy game, Master of Orion is lively and imaginative. A variety of factors keep the game challenging. The interaction of personalities and diplomacy creates surprises. Numerous technical developments can radically alter the balance of power in a short time. The only problem I found was in the difficulty levels. The Hard and Impossible levels improve the opponents by letting them build a *lot* more than the human player. This failing is common to many strategy games and should not significantly detract from your enjoyment of Master of Orion. (Microprose Software, Inc., 180 Lakefront Dr., Hunt Valley, MD 21030. 410/771-1151) ■

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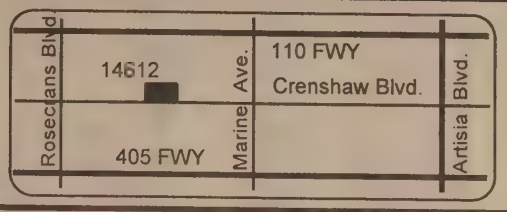

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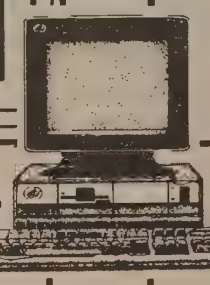

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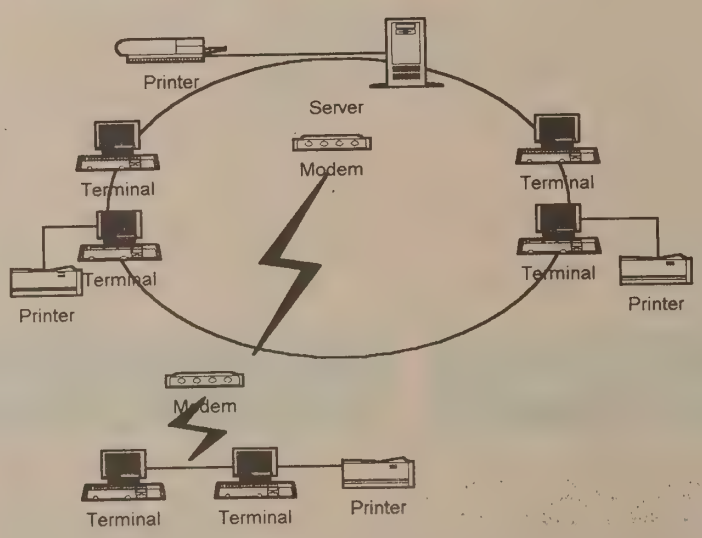

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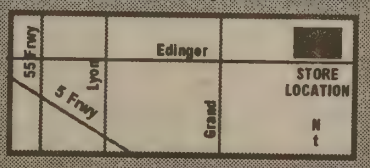

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- 200MB Hard Drive
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- 14" SVGA Monitor (.28dp)
- 101 Enhanced Keyboard

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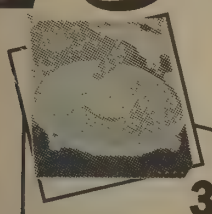

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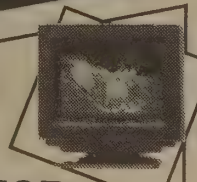

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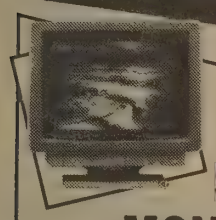

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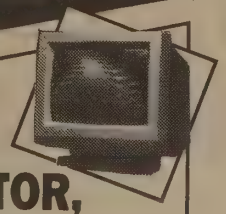

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VESA LB 486DX-50MHz w/128K Cache	$495
VESA LB 486DX2-50MHz w/128K Cache	$399
VESA LB 486DX-33MHz w/128K Cache	$360
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ISA 486SX-33MHz w/128K Cache	$230
ISA 486DLC-40MHz w/128K Cache	$185
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VGA 16 Bit 512K Card (1024x768 Res.)	$34
VGA 16 Bit 1MB Card (1024x768x256 Color)	$55
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VLB S3-805 Chip Windows Acc. w/1MB	$125
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VLB ET4000/32 w/1MB (1280x1024 Res.)	$139
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VLB IDE HD/FD & I/O Controller	$40
VLB IDE Cache Controller w/1M (DC680)	$149
VLB Adaptec SCSI Controller	$169
EISA SCSI Cache Controller w/1M (DC820)	$420

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101 Enhanced Non-click Keyboard	$19
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FOCUS 8000 Keyboard	$45
FOCUS 9000 Keyboard	$68

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RESOURCES

Calendar Of Events

CONFERENCES, SHOWS, AND SPECIAL EVENTS

FEBRUARY

February 19 Computer Show & Sale. CSUN, North Campus. Richard James Corp. Call: 1-800-685-1400.

February 19 Computer Show & Sale. Ventura Fairgrounds, Ventura. MarketPro Shows. Call: (415)388-8893.

February 20 Computer Show & Sale. CSUN; North Campus. Richard James Corp. Call: 1-800-685-1400.

February 20 Computer Show & Sale. Orange County Fairgrounds, Costa Mesa. Richard James Corp. Call: 1-800-685-1400.

February 20 Computer Show & Sale. Scottish Rite Center, San Diego. MarketPro Shows. Call: (415)388-8893.

February 21–25 Documentation '94 Conference And Exposition. Los Angeles. Graphics Communications Assoc. and Publishing Technology Mangement, Inc. Call: Tanya Boss, (703)519-8174.

February 22–23 CASE WORLD Conference. San Francisco. Smith & Shows. Call: (508)470-3880.

February 23 Federal On-Site Technology Expo. Oxnard. Federal Business Council, Inc. Call: 1-800-878-2940.

February 24 Federal On-Site Technology Expo. Lompoc. Federal Business Council, Inc. Call: 1-800-878-2940.

February 26–27 Computer Show And Sale. Pomona Fairplex. Computer Marketplace. Call: 1-800-800-5600.

MARCH

March 1–3 Intermedia: International Conference And Expo On Multimedia And CD-ROM. San Jose. Stamford Division. Call: (203)352-8254.

March 5 Computer Show And Sale. Sherman Entertainment Center, Reseda. Computer Marketplace. Call: 1-800-800-5600.

March 5 Computer Show & Sale. Anaheim Stadium, Anaheim. Richard James Corp. Call: 1-800-685-1400.

March 6 Computer Show And Sale. Sequoia Conference Center, Buena Park. Computer Marketplace. Call: 1-800-800-5600.

March 6 Computer Show & Sale. Glendale Civic Auditorium, Glendale. Richard James Corp. Call: 1-800-685-1400.

March 9 Federal On-Site Technology Expo. Corona. Federal Business Council, Inc. Call: 1-800-878-2940.

March 10 Federal On-Site Technology Expo. Laguna Niguel. Federal Business Council, Inc. Call: 1-800-878-2940.

March 12 Computer Show And Sale. Puyallup Fairgrounds, Puyallup. Computer Marketplace. Call: 1-800-800-5600.

March 12–13 Computer Show & Sale. CSUN, North Campus, Northridge. Richard James Corp. Call: 1-800-685-1400.

March 12–13 Computer Show & Sale. Ventura Fairgrounds, Ventura. MarketPro Shows. Call: (415)388-8893.

March 13–16 Software Publishers Association Spring Symposium 1994. San Francisco. Software Publishers Association. Call: (202)452-1600.

March 14–18 Business Software Solutions Software Development Conference. San Jose. Smith & Shows. Call: (415)905-2784.

March 14–18 Software Development '94 Conference. San Jose. Miller Freeman, Inc. Call: 1-800-441-8826.

March 15 Federal On-Site Technology Expo. El Segundo. Federal Business Council, Inc. Call: 1-800-878-2940.

March 18–20 National Products Computer Fair '94. Los Angeles Fairgrounds, Building 4. National Products. Call: 1-800-800-5600.

March 20 Computer Show & Sale. Industry Hills Sheraton, City of Industry. Richard James Corp. Call: 1-800-685-1400.

March 21–25 UniForum '94 San Francisco. IDG World Expo. Call: 1-800-225-4698.

March 22–23 The Consumer Online Services Conference: Entry Strategies For Mainstream Media. New York, New York. Jupiter Communications. Call: (212)941-9252.

March 22–25 Seybold Seminars. Boston. Seybold Seminars. Call: 1-800-488-2882

March 23 Federal On-Site Technology Expo. San Diego. Federal Business Council, Inc. Call: 1-800-878-2940.

March 24 Federal On-Site Technology Expo. San Diego. Federal Business

Continued

FEBRUARY 28

DEMONSTRATION OF SAMPLECELL II SAMPLE PLAYBACK CARD

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The combination of Digidesign's newest sample playback card, SampleCell II, with a Digidesign Session 8 PC or Mac system creates what many musicians would call the ultimate computer-based recording studio. Digidesign will hold a free introduction to SampleCell II combined with a Session 8 PC system at Goodman Music in Universal City. Space is limited for the 7:00 pm event. For reservations, call 1-800-333-2137, ext 133.

MARCH 16–19

TECHNOLOGIES AND PERSONS WITH DISABILITIES CONFERENCE

Los Angeles

This conference covers all aspects of disabilities. It brings together people with disabilities and their families, educators, administrators, rehabilitation counselors and engineers, and government officials. Sponsored by the Center on Disabilities at California State University Northridge (CSUN), the conference features a keynote address by Dr. Lawrence A. Scadden, senior program director at the National Science Foundation for the Program for Persons with Disabilities Call: (818)885-2578. Email: hmurphy@vax.csun.edu

MARCH 18–20

LOS ANGELES COMPUTER FAIR

Fairplex Expo Center, Pomona

With 450 exhibitors and fifty thousand attendees, the Los Angeles Computer Fair promises to be one of the largest consumer-oriented computer shows ever. Among the exciting fair events is a charity computer auction on Saturday, which will showcase equipment from Toshiba, Logitech, AST, IBM, Zeos, and other top manufacturers. Admission is $15. Call: National Productions, 1-800-800-5600.

THROUGH MAY

COREL WORLD DESIGN CONTEST

Ottawa, Canada

This fifth annual event is a forum for CorelDRAW artists; it encourages them to produce exciting and innovative designs that show off the power and versatility of CorelDRAW 4. The contest features nine design categories in total. Finalists will receive round-trip airfare and accommodations to attend a judging ceremony in Ottawa, Canada. The "Best of Show" winner will receive $100,000 in prizes and cash. Call: (613)728-8200.

THROUGH JUNE 30

ELECTRONIC ARTS SCHOLARSHIP CONTEST

San Mateo

Electronic Arts will award $25,000 scholarships to two children who dream up great ideas for computer games. The age categories are three- to seven-year-olds, and eight- to fourteen-year-olds. The three runners-up to the grand prize winners in each age category will receive computers or other education-related prizes. To receive an official entry form, write: Electronic Arts, College Scholarship, 1450 Fashion Island Blvd., San Mateo, CA 94404.

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SHOW DATES

February 5 & 6 Saturday & Sunday	**POMONA** - Fairplex (LA County Fairgrounds) Exit Highway 10 at Fairplex Drive. Go North to McKinley, turn right. Turn Left on White Avenue to Gate 14.	Admission: $7.00
February 12 Saturday	**RESEDA** - Sherman Entertainment Center From 101 Freeway, take Reseda off ramp, turn left (if traveling East) to Sherman Way, turn right, one block to Canby Street. 18430 Sherman Way.	**ADMISSION FREE!**
February 13 Sunday	**BUENA PARK** - Sequoia Conference Center Take the Beach Blvd. Exit off the 91 Freeway, go one block North to 7530 Orangethorpe.	Admission: $5.00
February 26 & 27 Saturday & Sunday	**POMONA** - Fairplex (LA County Fairgrounds)	Admission: $7.00
March 5 Saturday	**RESEDA** - Sherman Entertainment Center	**ADMISSION FREE!**
March 6 Sunday	**BUENA PARK** - Sequoia Conference Center	Admission: $5.00
March 12 Saturday	**PAYALLUP WASHINGTON** - Payallup Fairgrounds	Admission: $5.00

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Conner 340MB	270	Mitsumi 1.2/1.44MB	44/36
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Calendar Of Events continued

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March 26 Computer Show & Sale. Anaheim Stadium, Anaheim. Richard James Corp. Call: 1-800-685-1400.

March 26–27 Computer Show & Sale. Del Mar Fairgrounds, Del Mar. MarketPro Shows. Call: (415)388-8893.

March 29–30 Federal On-Site Technology Expo. San Diego. Federal Business Council, Inc. Call: 1-800-878-2940.

March 31 Federal On-Site Technology Expo. San Diego. Federal Business Council, Inc. Call: 1-800-878-2940.

CLASSES, SEMINARS, AND WORKSHOPS

FEBRUARY

February 22 Reinventing Hollywood Computer Media Salon. Los Angeles. The American Film Institute. Call: (213)856-7690.

February 22–23 WordPerfect 6.0 For Windows Class. Laguna Hills. Computer Education Institute. Call: (714)472-4192.

February 23–24 How To Build Your Own 486 PC Computer For Under $750 Class. College of the Desert. Jonathan Chilvers. Call: (619)773-2542.

February 26 How To Build Your Own 486 PC Computer For Under $750 Class. College of the Desert. Jonathan Chilvers. Call: (714)582-4650.

February 26–27 Production Tools Workshop. Los Angeles. The American Film Institute. Call: (213)856-7690.

February 28 C & C++ Programming Class. Laguna Hills. Computer Education Institute. Call: (714)472-4192.

MARCH

March 1 The Cutting Edge Computer Media Salon. Los Angeles. The American Film Institute. Call: (213)856-7690.

March 2 Copyright For The Digital Artist And Producer Workshop. Los Angeles. The American Film Institute. Call: (213)856-7690.

March 2–4 Advanced Programming Using Microsoft Access Seminar. Santa Ana. Infotec Training Institute. Call: 1-800-282-7990.

March 3 Basic Computer Animation Workshop Part 1: 2-D. Los Angeles. The American Film Institute. Call: (213)856-7690.

March 3 Basic Computer Animation Workshop Part 2: 3-D. Los Angeles. The American Film Institute. Call: (213)856-7690.

March 3–April 21 From Linear To Interactive Design Workshop. Los Angeles. The American Film Institute. Call: (213)856-7690.

March 5–6 Master Class With Russel Brown: Photoshop And Makeup Design Previsualization. Los Angeles. The American Film Institute. Call: (213)856-7690.

March 7–10 Microsoft Windows 3.1 For Support Professionals Seminar. Los Angeles. Infotec Training Institute. Call: 1-800-282-7990.

March 7–11 Supporting Microsoft Windows NT Course. West Los Angeles. Infotec Training Institute. Call: 1-800-282-7990.

March 7– 24 The Art And Craft Of Animation Course. Los Angeles. The American Film Institute. Call: (213)856-7690.

March 8 Interactive And Hollywood Computer Media Salon. Los Angeles. The American Film Institute. Call: (213)856-7690.

March 9–10 Adobe Photoshop For Animation Workshop. Los Angeles. The American Film Institute. Call: (213)856-7690.

March 12 Making Money With Multimedia Seminar. North Hollywood Sensational Seminars. Call: (310)288-3426.

March 14–17 Microsoft Windows 3.1 For Support Professionals Seminar. Santa Ana. Infotec Training Institute. Call: 1-800-282-7990.

March 17–18 Netware Getting Started Seminar. Los Angeles. Center for Advanced Professional Development. Call: (714)261-0240.

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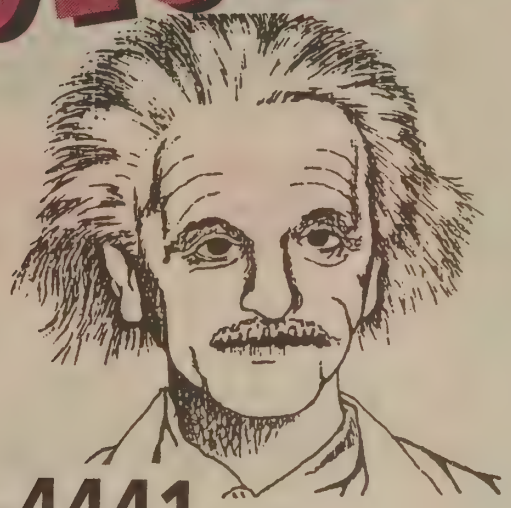

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SoundBlaster 16 SCS1-2	$173
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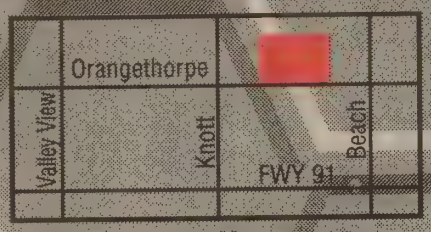

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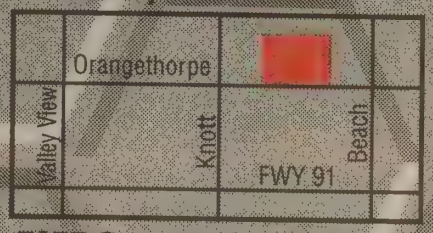

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486 SX-33Mhz with 128K cache	$245/$230
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486 VESA local bus motherboard with 128K cache, NO CPU	$105/$100
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Diamond Viper VLB, 2MB VRAM SVGA card (16.7 mil colors)	$380/$370
Trident 1MB SVGA card	$90/$87
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IDE cache controller (4HD/2FD, 512K to 16MB w/OK)	$190/$180
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ISA Add-on Boards	
Trident SVGA card with 1MB, 16 million color	$60/$57
16bit NE2000 Ethernet card	$80/$77
16bit NE2000 Ethernet card, 10BaseT	$85/$82
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Sound Blaster Pro Deluxe	$125/$121
Sound Blaster 16 ASP	$220/$215
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9600/2400 baud internal fax/modem	$48/$45
14,400 baud internal fax/modem, v.32bis, v.42bis	$135/$130

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TEAC 2.88MB 3 1/2" FDD	$110/$105
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250MB, Conner CD-30254 IDE HD (14ms, 64K cache)	$245/$235
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340MB, Maxtor MX-7340A IDE HD (13ms)	$310/$300
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1.0 GIG, Conner fast SCSI-2 HD	$785/$745
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Hewlett-Packard DeskJet 550C Color InkJet printer	CALL
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Hewlett-Packard LaserJet 4	$1380/$1350
Hewlett-Packard LaserJet 4M	$1860/$1820
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Panasonic KX-P2123 Quiet Printer (24pin/240cps/80col/color opt)	$245/$240
Color kit for the above printer	$45/$43

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AST KB-101 enhanced keyboard (non-click)	$40/$37
Focus 2001 101 keyboard (click, hard dustcover)	$42/$40
KME keymouse 101 keyboard (click, track-ball built-in)	$62/$60

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Mini-desktop case (200w ps)	$65/$62
Mid-tower case (230w ps)	$69/$67
Full-tower case (250w ps)	$89/$87

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213

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310

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619

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708

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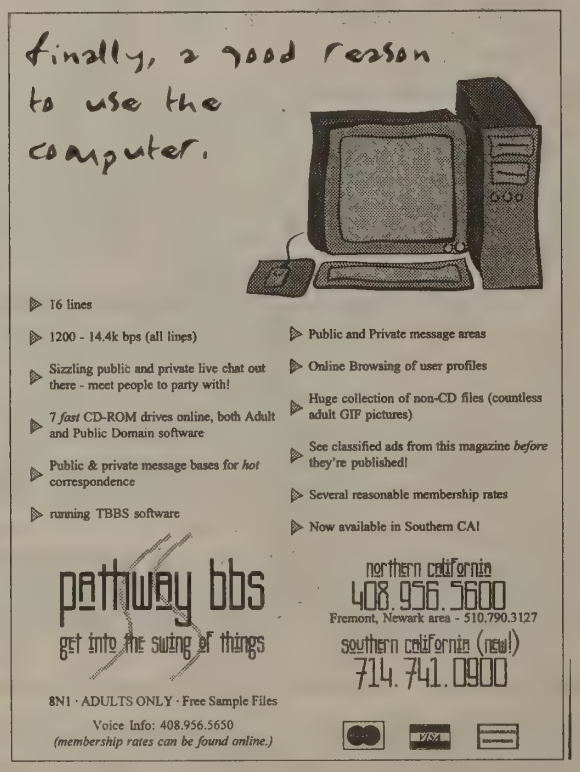
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Continued

BBS Spotlight

By John Wolcott

Checking In At The Tavern

One of the first things you'll look for in a BBS is a welcoming atmosphere. Whether you're new to modem use or an old-timer, using a system that's easy to get around in and has a sysop who's friendly and helpful will really make a difference in your BBS experience.

This month's BBS Spotlight takes a look at a system where the sysop focuses on making your modeming experience a good one by offering basic BBS features, with an extra dose of user help, all at the right price. Free!

The Tavern is located in Chino (near Pomona). It features two incoming phone lines, supported by two separate computer systems. Both lines support 14,400 baud on a US Robotics HST Dual Standard and a Zoom 14,400 Fax/Modem to help speed your way through system use. The BBS software in use is Maximus v2.0 with ANSI graphics to provide a more than adequate appearance.

Sysop Don Duperault, alias "The Bartender," is proud to offer an environment that's open to all modem users and doesn't charge a subscription fee. There are no upload/download ratios and most users find that the standard time limitations meet their needs. Don comments, "I just wanted to put together a system that users feel comfortable in. So many sysops are unfriendly and less than helpful. You won't find that here. All are welcome." Don works hard at maintaining a system that is really a service to the users.

After logging on, you'll be pleased to experience a minimal registration procedure; after which you are granted full access to system features, with one minor exception: access to adult-oriented material is limited to those who have provided proof of age to the sysop by mail. Your first time on will provide you with basic system information that you'll get to see only once. The "standard disclaimer" presented here is a "must read." It's no ordinary disclaimer. It took me a full five minutes to stop laughing. It's refreshing to encounter a sysop with a great sense of humor. After wading through the system bulletins, you'll be greeted by the main menu with a constant reminder of how much time you have left on the system. Online time is limited to forty-five minutes. This limit allows users plenty of system time for downloading and modem play without allowing "time hogs" to dominate the system.

Features accessible from the main menu are Message Areas with an "off-line mail reader," File Areas to send or receive files, Doors for online gaming, Help for those not familiar with system use, Chat With On-Line Drunks, and a User List. Nothing here is too flashy; just good, basic BBS features.

The message areas include the ability to leave and read messages to and from other system users. The off-line mail reader will allow you to conserve your alloted system use time and allow others access to the BBS while you read your mail. This amounts to a courtesy to other users, especially when you're using a system with a minimal amount of incoming phone lines. The system is also linked to Usenet, which is linked to the Internet. This allows access to over four hundred different message areas from the Internet. The link to Usenet currently only allows you to read posted messages from the Internet, but the sysop is actively seeking a reliable link for being able to post messages. This upgrade is anticipated to occur soon.

File areas are large and growing. Files on the system are primarily of the IBM/PC compatible format. The system currently boasts 7GB of files for download, with a wide range of software topics. As

Continued

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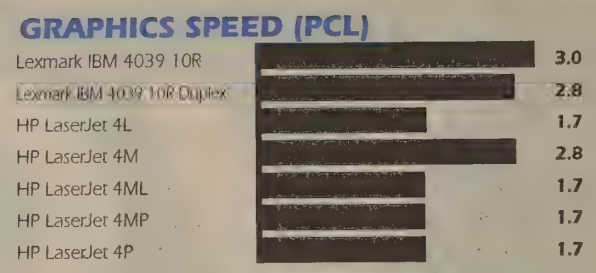

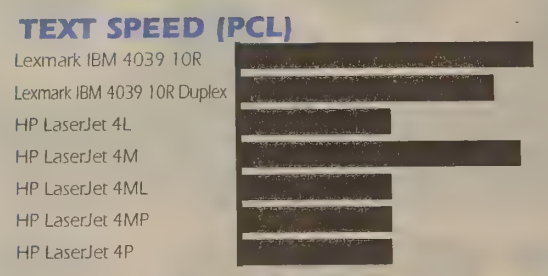

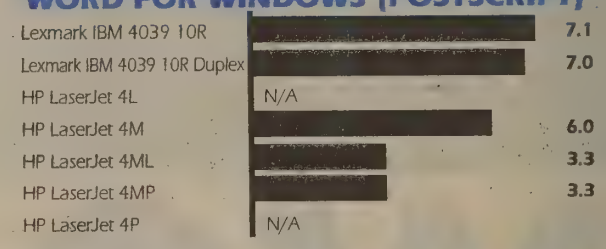

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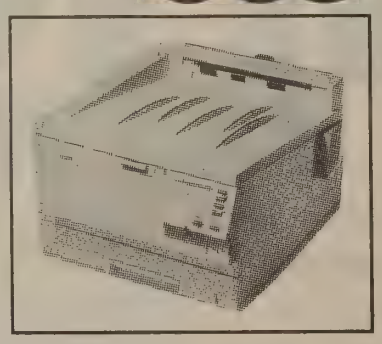

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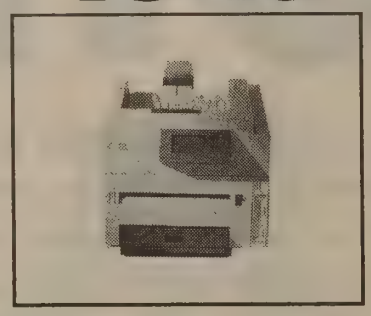

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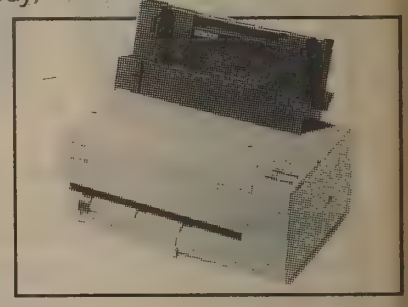

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BBSes continued...

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Commodore Computing. (714)673-2185. 8N1, 24 hrs., 300/1200/2400. Supports C64/128. Free. Sysops: Stephen Fabre/Jay Darrow. [Exp. #120.]

The CyberNet BBS. (714)378-0085, 378-0741. 24 hrs., 2400–57,600. Downloads, FidoNet, Aminet, games, message bases, 15,000 Internet files online. Free. [Exp. #122.]

Free Money Manager BBS. (714)642-7627. 8-N-1, 1200/2400. Free money manager files, online support. Free. [Exp. #122.]

Homes For Sale In SoCal. (714)990-4802. 8-N-1, 24 hrs. 300/1200/2400/9600. Free. [Exp. #120.]

MacShak BBS. (714)373-0656. 24 hrs., 2400. Newly expanded Mac, amateur radio, consumer, and adult interests. Sysop: Dude B. Narley. [Exp. #122.]

The Punkin Duster BBS. (714)522-3980. 8-N-1, 24 hrs., 2400/9600/14,400/ 16,800. RIME email, thousands of files, online games, multinode PC board 15.0. Sysop: Dave Ludwig. [Exp. #120.]

Reality Network BBS. (714)969-9624. 8-N-1, 24 hrs., 300/1200/2400/9600/ 14,400. 14 lines. ANSI & RIP. Realty info, majornet,. maillink for email, forums, chat. Free. Sysop: Doug Cambell. [Exp. #120.]

Shoot The Moon Music BBS. (714)995-1004. 8-N-1, 24 hrs., 14,400. Music, gifts. Sysop: Ken Hada; John Wackerman. [Exp. #120.]

Viewlink BBS. (714)650-4612. 24 hrs., 14,400. Latest shareware, hottest adult GIFs, job listings. 28¢ per hour. Sysop: Terry Andrews. [Exp. #122.]

805

ROLNet. (805)948-4900. 24 hrs., 14,400. Public policy discussions, White House Info, Antel, Valley Business and Community Board, HomeSchool Net, and more. [Exp. #120.]

818

Asian American BBS. (818)284-4519. 1200/2400/9600/14,400. Focus on cultural and business exchanges, serious and mature users only. Sysop: Gerald Fong. [Exp. #120.]

InvestorLink. (818)331-4611. 24 hrs., 2400. Stocks, mutual funds, real estate, personal finance, daily news, commodity prices. Free. Sysop: Steve Painter. [Exp. #122.]

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The Wine Connection BBS. (818)718-5994. 8-N-1, 14,400. five lines. Chat, message boards for wine enthusiasts and much more. Free. Sysop: Paul Sennett. [Exp. #120.]

Wizardry BBS. (818)222-4444. 1200/4800/9600/14,400. Online games, downloads, uploads, Gifs, text files. Free. [Exp. #122.]

909

BBS Pavillion. (909)245-2171. 8-N-1, 24 hrs., 14,400. Shopping mall, CD-ROMs, matchmaker, conferences, games, adult section. $3.00 per month membership. [Exp. #120.]

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BBS Spotlight continued...

the BBS budget allows, "The Bartender" is adding drives. The system includes three CD-ROM drives, and the sysop has the ability to change the CDs to allow an even more expansive library of files.

Online gaming through Doors features Tradewars 2000, The Pit, and Star Trek Trivia. These online games offer a voyage into fantasy role playing that is a pleasant diversion from reading mail and downloading files. I attempted a training mission in the Star Trek Trivia game. I was abruptly scolded and barred from training exercises until the next day for not knowing the actor's name for the character "Q" on *Star Trek, The Next Generation.* Sheesh! (Okay, so I don't watch much TV.) If you like trivia and are a Trekkie, this might be your cup of tea.

You may elect to chat with another user if the other system node is in use. Don't be shy! I have found that other BBS users are usually friendly and this is a great place to pick up a BBS tip or two. With the system currently being limited to two incoming phone lines, your chatting experience here will be somewhat limited. The sysop has plans for system expansion that include more lines.

You'll find The Tavern to be a pleasing BBS experience. With a friendly and helpful sysop at the helm, you can't go wrong. Time on this system is a good BBS investment. The Tavern can be reached by calling (909)591-9149 or (909)591-8310 using the standard parameters of 8-N-1. Check in and say "hi" to The Bartender. Tell him *MicroTimes* sent you. ■

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ASSOCIATIONS

Computer Language Society. Meetings: 3rd Wed., 7:00 pm, Veterans Memorial Building, Room A, Overland and Culver, Culver City. Call: Bill Sharpe. (310) 451-9598. [Exp. #120.]

Independent Computer Consultants Association, Los Angeles Chapter. Meetings: 1st Thurs., 6:00 pm. Prepaid reservation, $25, or at the door, $35. The LA chapter provides referral services. Call: (213)872-1811. [Exp. #124.]

Orange County Independent Computer Consultants Association. Call: (714)552-2384. [Exp. #121.]

Southern California Computer Society. Meetings: 4th Tues., 7:00 pm, Farmers & Merchants Bank, 12535 Seal Beach Blvd., Rossmoor, on southern side of Rossmoor shopping area. Call: Hank Burwash, (310)596-9670. We welcome all who are interested in computers. BBS and monthly newsletter. $15 dues per year. [Exp. #124.]

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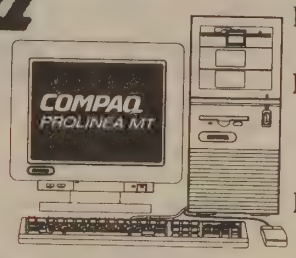

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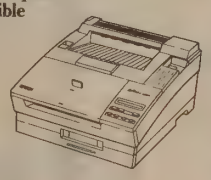

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USER GROUPS

ACCOUNTING

M*A*S90 User Group. Meetings: 3rd Wed., 6:30 pm, 22952 Alcalde Dr., Suite 130, Laguna Hills. Call: Ron Jacobs, (714)583-0424 x151. [Exp. #120.]

AMIGA

Amiga User Group Of Long Beach. Meetings: 1st Thurs., 7:00 pm, 5373 E. Second St., Belmont Shores (in the Fire Station Bldg.). Call: Larry, (310)429-0752. [Exp. #123.]

ATUG—San Gabriel Valley. Meetings: last Tues., 7:00 pm, Michelangelo's Pizza, San Dimas; 3rd Sat., 11:00 am, 1st Southern Baptist Church, Temple City. Call: Steve, (818)285-6424. [Exp. #124.]

LAAUG—Los Angeles Amiga User Group. Meetings: 3rd Wednesday, 7:30 pm. Veteran's Memorial Auditorium, Overland Ave. & Culver Blvd. Super SIGs, PD disks. Call: Kip Hammond, (310)390-3010. LAAUGLine BBS: (213)387-1002. [Exp. #123.]

APPLE

Champions Of The Mac Proletariat (CHOMP). Meetings: 4th Thurs., 7:30 pm, Cal Poly Pomona. Question and answer, raffle of useful software, opportunity to purchase disks. Call: Craig Richards (909)985-7385. [Exp. #123.]

ATARI

ATESIG—Atari 8-Bit SIG. Meetings: 145 Surf Pl., Seal Beach. Cooperative group for Model Railroad applications. Call: (310)430-5433. [Exp. #123.]

COMMODORE

Commodore Technical Users Group (C=TUG). Meetings: 4th Sunday, 1:00 pm, Senior Citizen Center, 170 S. Olive St., Orange. Public domain library, documents library, and magazine. Software and hardware help. Call: Lou Palush, (714)532-1802. [Exp. #123.]

South Bay Commodore Users Group. Meetings: 3rd Thurs., 7:00 pm. S.C.E Redondo Generating Station, 1100 Harbor Dr. (across from King Yatch Harbor). Support for 64/128 computers. Open to all users of Commodore Computer equipment and those who would like to receive or exchange information on programs, applications, or hardware. Call: Dave LeGalley, (310)324-8357. [Exp. #123.]

CORELDRAW

Corel (ACAD) User Group. Meetings: 2nd to last Tues., 7:00 pm, Glendale Federal Bank Building, 401 N. Blvd. Product demos, Q&A. Call: Art, (213)935-1958. [Exp. #124.]

IBM & COMPATIBLES

Greater South Bay PC User Group. Meetings: 2nd Thurs., 7:30 pm, Torrance Recreation Center located behind the main city library, Torrance. Visitors welcome. Call: (310)329-2804. [Exp. #124.]

Long Beach IBM PC And Compatibles User Group. Meetings: 3rd Wed, 7:00 pm, Masonic Temple, 1120 E. Market St., Long Beach. Novice and experienced welcome. $25/yr, $35 for a family. Call: Jim Wells, (310)439-7114. [Exp. #121.]

Orange County IBM PC Users Group. Meetings: 2nd Tuesday, 6:30 pm. Computer Learning Center, 1240 S. State College Blvd., Anaheim. Speakers, software, newsletter. Open to public, all welcome. Call: (714)990-0580 [Exp. #123.]

Pasadena IBM User Group. Meetings: 3rd Wed., 7:00 pm, 2184 N. Lake Ave., Altadena. Speakers on hardware/software, SIGs, library, newsletter, and BBS. Call: Steve Bass, (818)791-1300. [Exp. #123.]

Thousand Oaks Personal Computer Club (TOPCC). Meetings: 3rd Thurs., 6:30 pm, Goebel Senior Adult Center, 1385 E. Janss Rd., Thousand Oaks. Call: (805)523-1924. [Exp. #123.]

TUG-NET. Meetings: 1st three Thurs., 7:00 pm, Tektronix Corp., 21300 Erwin St., Woodland Hills. Enter through back door of building, press buzzer. Call: (818)249-1629. [Exp. #123.]

Valley Computer Club. Meetings: 1st Wed., 7:00 pm, Glendale Federal Bank, 7119 Topanga Cyn., Canoga Park. BBS, PD library, SIGs, newsletter. All welcome. Call: Estella McClintock, (818)848-1948; or Grayce Hruda, (818)842-3707. [Exp. #123]

KAYPRO

KAYOS Kaypro User Group. Meetings: 4th Mon. of even months, 6:00 pm, El Segundo Library. Call: (310)379-8339. [Exp. #124.]

MACINTOSH

Champions Of The Mac Proletariat (CHOMP). Meetings: 4th Thurs., 7:30 pm, Cal Poly Pomona, grey building near administration building, rm. P2-7. Call: Craig Richards (909)985-7385 or Mitch Cohen, (909)598-5766. [Exp. #123.]

South Bay Apple Macintosh User Group. Meetings: Last Wed., 8:00 pm, El Camino College, MCSC Rm. 100, 16007 Crenshaw Blvd., Torrance. Call: (310)644-3315. [Exp. #123.]

West Orange County Macintosh User Group (WOCMUG). Meetings: last Tues., 7:00 pm, Carver Elementary School Auditorium, 5335 E Pavo St., Long Beach. Come and join with other Mac Users to share knowledge and experiences. Call: Lynn Goodrich (714)892-8910 or Tony Muller (310)493-1240. [Exp. #123.]

PROGRAMMING

Software Toolsmiths. Meetings: Last Sat., 10:00 am, Joslyn Center, 339 Sheldon St., El Segundo, CA. Discussion and tutorials on programming, including C++, Forth, J, Smalltalk, algorithms, operating systems, and hardware. Neophytes welcome. Call: John LuValle, (818)797-1820, or Howard Rogers, (310)532-3342. [Exp. #124.]

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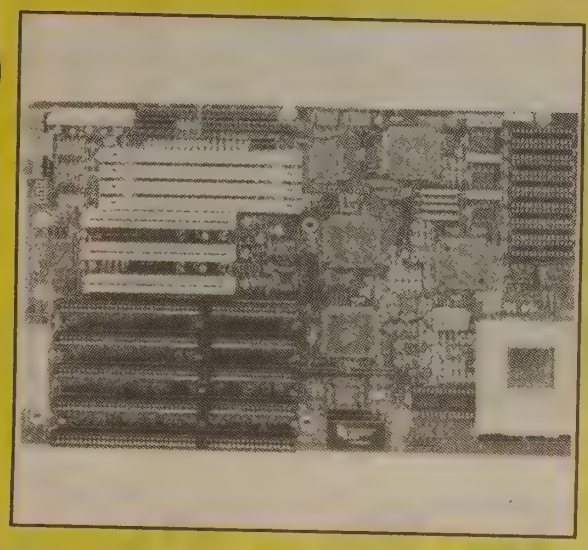

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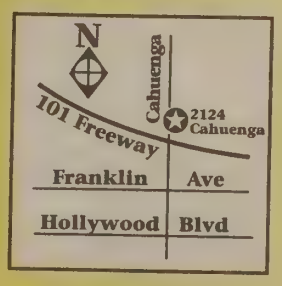

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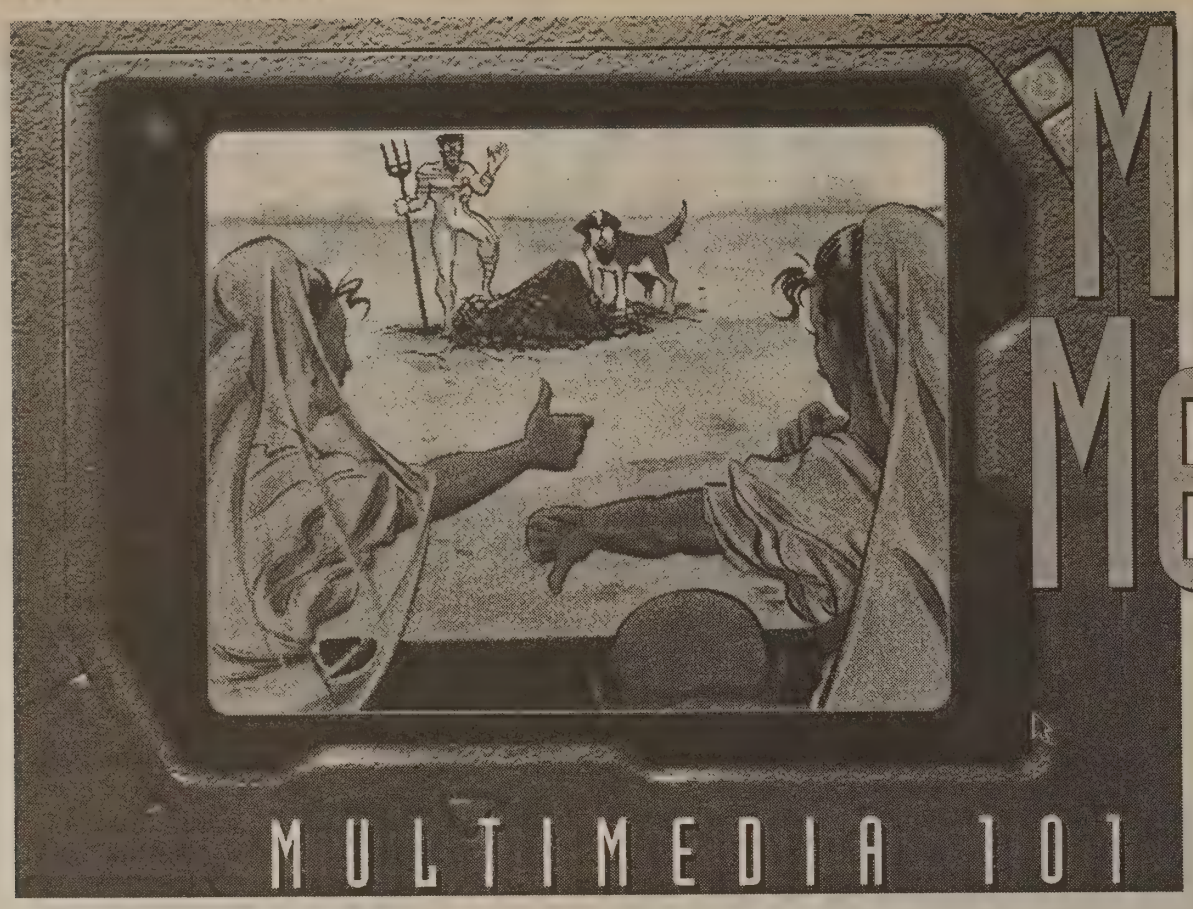

Multi Media & beyond

Violence In The Streets And Sanctuary Woods

BY JONATHAN E.

The news media, politicians, and public opinion are currently in an uproar about violence in the streets. Video games have been cited as a cause of the increased rate of murder of teenagers by teenagers. In particular, the games' interactivity, or user-caused actions, and their repetitive nature are identified as contributing to decreased sensitivity towards the consequences of violent acts. It's beyond the scope of this column to discuss this issue in great depth, but, at an emotional level, I am persuaded that violence-depicting video games are likely to be one factor in certain acts of violence. I don't believe that they're the only contributing factor. Furthermore, I think it extremely unlikely that they could ever be shown to be the determining factor except perhaps in a few isolated circumstances.

There are many who believe that the depiction of violent acts in fictional games or dramas cannot have any effects in real life. I venture that one reason for this is because, if one were to identify such depiction as leading to real-life violence, one would have to ask the nettlesome question of whether such depiction for financial gain should be protected as freedom of speech or expression. Clearly, making money is the goal of the mainstream corporate video game industry whatever idealistic, artistic, or intellectual aims some individuals within the industry may have. Video games and home-computer games are somewhat different from one another, but broadly similar enough that, should the questions of censorship or ratings come to the point of legislation, they are likely to be considered in the same light.

Sanctuary Woods is a company that believes that games can have an effect. Surely one of its goals is to make money, but it has chosen to do so by marketing multimedia games for home computers that attempt to teach values other than ripping the heads off one's opponents. It is also one of very few that market a comput-

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er game specifically for girls. If rating of games ever comes about, Sanctuary Woods' current titles would certainly receive a G.

HAWAII HIGH—THE MYSTERY OF THE TIKI

The Mystery of the Tiki is the first of a projected Hawaii High series of interactive comic-book adventures written and illustrated by noted comic-book artist Trina Robbins. The title is designed for girls from eight to twelve years old. Robbins had originally proposed the series as traditional paper-based comics to major comic-book publishers. After being turned down, she contacted Sanctuary Woods and recast the proposal as an interactive multimedia product with "edutainment" value.

The story line is relatively simple and traditional. Jennifer moves from New York City to Hawaii, meets a new friend at school, Maleah, and the two set off on an adventure involving a stolen tiki and a couple of villainous thieves through exotic Hawaiian locales. The new media aspects are also relatively simple and consist mostly of what's rapidly becoming traditional in new media: sound and animations; some fairly straightforward puzzles, quizzes, and mazes; a series of branches that can lead to either dead ends or retracing your path depending on whether you make the correct choices; one alternative route through part of the story; and some "hypertext" material, including QuickTime movies, on aspects of Hawaiian history, culture, flora and fauna, and geography.

It may be simple, but it seems appropriate for the intended age group, and it is done very well. Everything worked as it was supposed to, and, try as I might, I could not find any bugs.

I have some slight reservation about the way active screen areas are indicated, which, in general concept, The Mystery of the Tiki shares with the other Sanctuary Woods series, Victor Vector & Yondo. In The Mystery of the Tiki, as the cursor passes over an active area an icon appears on the sea shell graphic in the lower left corner. This requires you to attempt to look at two places at once—the main screen where your cursor is and down to the side. If you're looking at the main screen and moving the mouse fast, the icon flashes on and off so fast that you barely notice it out of the corner of your eye. It would be distinctly preferable for the cursor itself to change shape when over an active area.

The general design, however, is attractive. Trina Robbins' illustration style is straightforwardly comic book, suiting the needs of the material and inducing an effective atmosphere for the various different screens. The coloring is nicely done—rich enough to be appealing but not overly fussy. The icon design is easy to understand. The absolutely essential requirement of no menu bar for this kind of title is met. The sounds are appropriate and well produced, although occasionally repetitive and sometimes the music is a little too obvious.

INTERACTIVITY

"Interactivity" is a word that means many things under different circumstances. In The Mystery of the Tiki, a portion of the interactivity simply allows you to control the forward pacing of the story in the manner of turning the pages of a book at your own pace. Complete freedom of navigation, as found in Myst with its three-dimensional world, or the ability to flip back, as through the pages of a book, is not available in The Mystery of the Tiki, except in very limited circumstances from a few screens or through the plot map. Additional standard interactivity is provided by the ability to cause various screen actions and sounds to occur. Much of this is quite witty or charming—I particularly liked the smiley faces on the shirt of one of the villains sticking out their little red tongues. The ability to get the characters to repeat their lines helps to decipher some clues about what to do next.

The interactivity of the story line branching leads to situations where, if you

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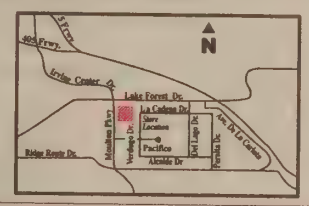

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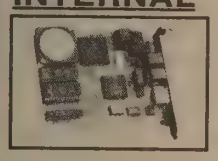

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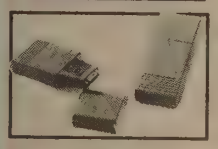

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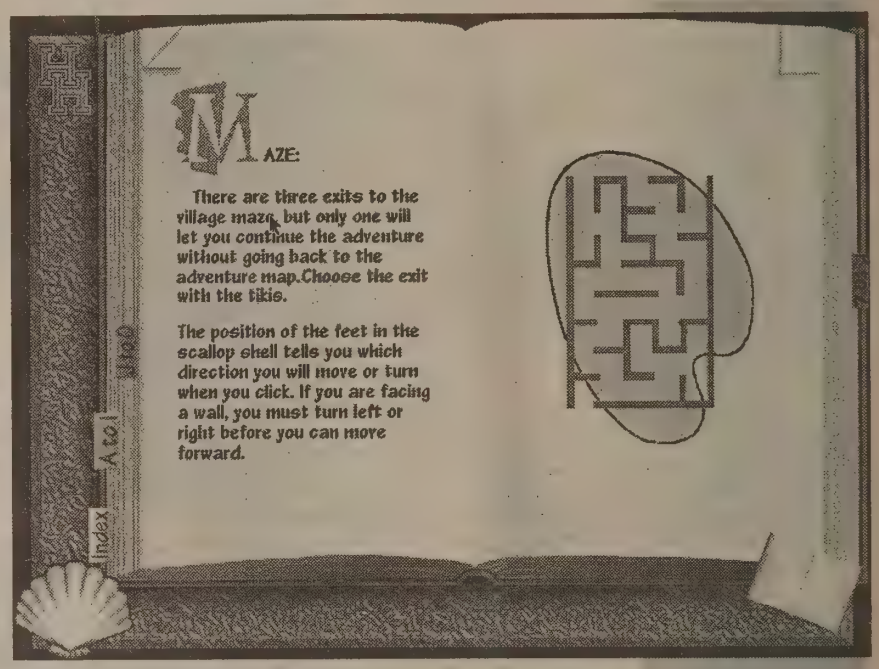
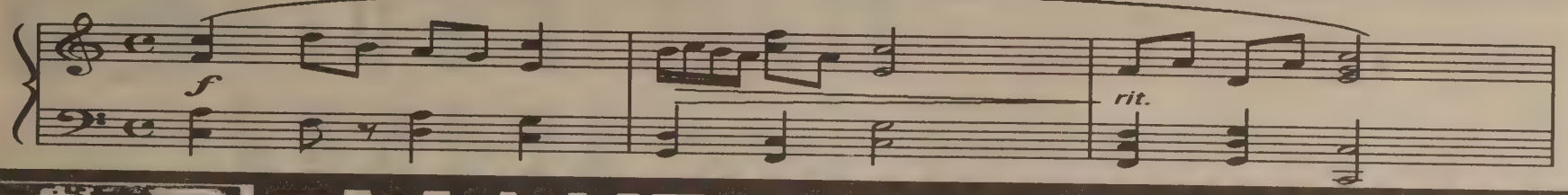
make the wrong choices, Jennifer and Maleah's adventure ends. When this happens, a screen appears with "The End...or is it?" Your ability to get back into the game easily at this point is one of the title's strongest features. Clicking on the HH icon at the top left of the screen takes you to the main menu from which you can select "Adventure," which displays a plot map with your path so far indicated by a series of octogons, each


MAZE:
There are three exits to the village maze, but only one will let you continue the adventure without going back to the adventure map. Choose the exit with the tikis.
The position of the feet in the scallop shell tells you which direction you will move or turn when you click. If you are facing a wall, you must turn left or right before you can move forward.
Index
A to Z

enclosing a miniature scene. If you haven't been to an area, the octogon is blank. You can reenter the story at any previously visited point. If you see that you've missed one of the sidetracks, you can go back to explore that sidetrack or, if you want to take the alternative story route, you can go back to where it splits. Unlike most games, this is available without having saved the game. If you want to quit and come back later, saving the game will preserve your progress and you'll be able to reenter at any earlier plot point.

An important technique in this medium for involving the user in an imaginary world is the use of interactivity provided by puzzles, other brain teasers, or tests of hand-eye coordination. The Mystery of the Tiki has several of these, including a couple of mazes, clicking on animals' eyes shining in the dark to reveal them, a game of concentration to match like pairs of hidden objects as you uncover them, matching shapes, and a quiz on Hawaiian facts. If you fail at these, you get the "The End...or is it?" screen. With the exception of one of the mazes, all these tests seem to be on the easy side. One difficulty with this aspect of the title is that what might be too difficult for an eight-year-old would be too easy for a twelve-year-old. The solution would be to provide an option for different age levels. A good feature is that there is a random element to the games so that the puzzles or routes through the mazes are not the same every time you play.

One other form of interactivity present is the use of "hypertext" material designed to reveal facts about Hawaii beyond what occurs in the main course of the narrative. This happens in the school library where



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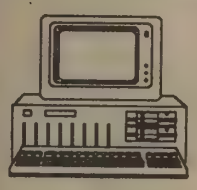

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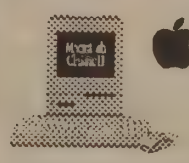

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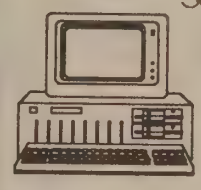

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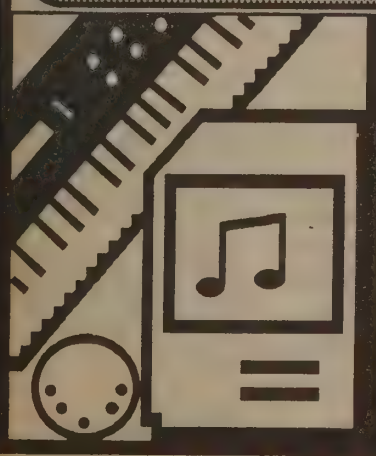

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books and videos can be taken off the shelves and in the classroom scene where clicking on words on the blackboard causes information to be revealed. There is also a red book graphic always present in the lower right corner of the screen. If this is dragged to the appropriate object, it opens to an entry about that object. Once the book is open, you can turn the pages or use the index to find entries you're interested in. The problem with this scheme is that you have to drag the book to the right place to open it. The information presented is of good quality with some depth and seems well suited to the intended age group. I thought that not enough of it was actually needed for getting through the game, although this may only be because, at my advanced age, I already have the general background knowledge that a child would pick up from it and find useful in understanding the story.

SEXISM?

I have a similar handicap in evaluating the title from the viewpoint of a girl.

I asked an adult, self-confessed fan of video games of the head-ripping variety, Candice Pacheco of D'Cückoo, for her opinion. It was swift and cruel. She thought The Mystery of the Tiki was sexist and perpetuated stereotypes. I can see her point. The theme song is about Waikiki where "the golden sands attract the cutest boys." Jennifer has an overdeveloped taste for pink clothing and is afraid of the big waves in the surfing scene. It's true that she's fresh from New York City, but her island-bred companion, Maleah, doesn't surf either while the boys are happily riding the waves. There are also lots of girlish giggles and fluttering of eyelashes.

On the other hand, in the course of the story, the characters of the two girls develop while the male villains remain little more than stereotypes. The girls exercise initiative by setting off on their adventure together, leaving their homes in the middle of the night. They face perils and challenges that they successfully overcome. Boys could take offense from a sly dig at boys when a beachball bounces off a boy's head with a hollow boink, while it makes a normal thump sound when it bounces off a girl's head. Lawyers might take offense at the end of the story when one of the defeated villains declares, "I'm going back to school to become a lawyer."

Sanctuary Woods has chosen to market multimedia games for home computers that attempt to teach values other than ripping the heads off one's opponents. It is also one of very few that market a computer game specifically for girls.

I find sexism possibly more apparent when comparing The Mystery of the Tiki to the other Sanctuary Woods series, the Victor Vector & Yondo games for boys in the same age group. This is because the boys' games are considerably more difficult and complicated than the girls' title, requiring much more skill to complete. In addition, the boys get to fight! It's pretty tame stuff compared to most on-screen violence, and intelligence rather than brute force generally determines the outcome. This may just be marketing, but marketing is a way of catering to people's prejudices and tastes without actually changing anything that may well need changing. The juxtaposition of Hawaii High with Victor Vector & Yondo shows that there's more to making the world a better place than simply producing a multimedia product for girls.

VICTOR VECTOR & YONDO

I also looked at two Victor Vector & Yondo titles, The Hypnotic Harp and The Cyberplasm Formula. The Cyberplasm Formula is the later produced of the two, and clearly much had been learned from the earlier production. The graphics are much improved and the indication of active screen areas and the general navigational design are also better, although still subject to the comments above concerning The Mystery of the Tiki. The use of a plot map would be a further improvement. The plot and the game playing are also more satisfactory and sophisticated than in The Hypnotic Harp. The educational parts of the "edutainment" aspects of either title are considerably slimmer that those found in The Mystery of the Tiki.

TECHNICAL DETAILS

All three titles run on either Macintosh or MPC machines with both a hard-disk drive and a CD-ROM drive. Requirements for Macintosh machines are 4 MB of RAM, System 7.0 or later, and a 13" monitor or larger set at 256 colors. MPC requirements are a 386SX processor or higher, 4 MB of RAM, Windows 3.1 or higher, Super VGA monitor (640 x 480, 256 colors), and a sound card. The suggested retail price for all three titles is $39.95. Sanctuary Woods are at 1875 South Grant Street, San Mateo, CA 94402; (415)578-6340, 1-800-872-3518. ■

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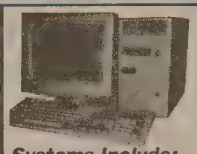

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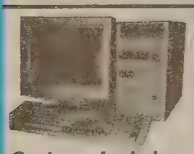

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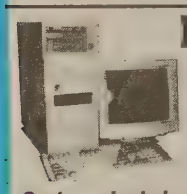

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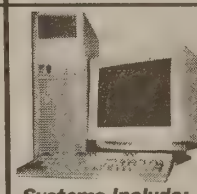

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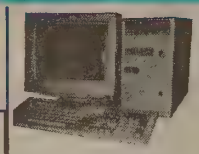

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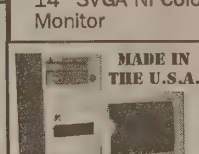

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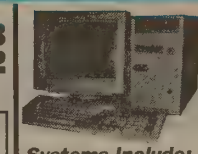

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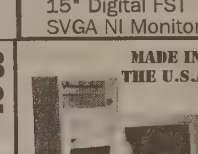

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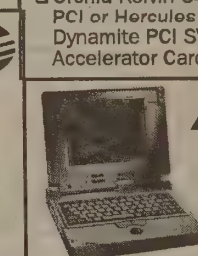

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w/256K Cache, 5 EISA & 2 VLB Slots, Bus Mastering, Made in the U.S.A.

Premium Base Systems w/ AIR Motherboards

AIR Baby 486 VLB M/B w/256K **$680**
Cache, 3 VLB Slots, Bus Mastering, ZIF Socket
AIR Baby 486 EISA VLB M/B w/256K .. **$870**
Cache, 5 EISA/3VLB Slots, ZIF Socket, 72Pin SIMMS
AIR Baby 486 EISA VLB M/B w/256K .. **$880**
Cache, 5 EISA/3VLB Slots, ZIF Socket, 30Pin SIMMS

Premium Base Systems w/ AMI Motherboards

AMI SuperVoyager VLB M/B **$1060**
w/256K Cache, 2 VLB/5ISA Slots
AMI Enterprise IV EISA/VLB M/B . **$1180**
w/256K Cache, 7EISA/2VLB Slots, w/ I/O Ports

Premium Base Systems w/ MICRONICS Mbds

MX-30 486 VLB M/B w/256K **$980**
Cache, 2VLB/6ISA Slots, 72Pin SIMM, ZIF Socket
JX-30 486 VLB M/B w/256K **$1040**
Cache, 2VLB/5ISA Slots, 72Pin SIMM, ZIF Socket
E3 486 EISA M/B w/256K Cache . **$11[illegible]**
8 EISA Slots, 72Pin SIMM, ZIF Socket
EV 486 EISA VLB M/B 256K..... **$1245**
Cache, 6EISA/2VLB Slots, 72Pin SIMM, ZIF Socket

Without The Hassles

Monitors

AMDEK 432N 14" MonoVGA (Amber/White) $125

CTX

5439A 14" SVGA (1024x768,.39dp) $218
5468A 14" SVGA (1024x768,.28dp) $249
1451 14" Full -Screen NI (1024x768,.28dp) .. $270
1461LR 14" NI (1024x768, 72Hz refresh) $305
1560LR 15" Digital NI (1024x768,.28dp) $380
1760LR 17" Digital NI (1280x1024,.28dp) $685

Infinity

IE1439SV 14" SVGA (1024x768,.39dp) $204
IK1439SV 14" Full SVGA (1024x768,.39dp) .. $209
IE1428SV 14" SVGA (1024x768,.28dp) $235
IK1428SV 14" Full SVGA (1024x768,.28dp) .. $239
IE1428N4 14" Full SVGA NI (1024x768,.28dp) .. $253
IK1428N4 14" Full SVGA NI (1024x768,.28dp) .. $256
IS1528N5 15" FST SVGA NI (1024x768,.28dp) . $340
IK1528DN6 15" Digital FST (1280x1024,.28dp) $384
IE1728N6 17" FST SVGA NI (1280x1024,.28) ... $645
IK1726DN7 17" Digital FST (1600x1200,.26dp) $699

Digiview

HR-1401 14" SVGA (1024x768,.39dp) $210
HR-1428 14" SVGA (1024x768,.28dp) $240
HR-1431 14" SVGA NI (1024x768,.28dp) $260

MAG

1564 15" SVGA NI (1280x1024,.28dp) $420
MX-15F 15" Digital NI (1280x1024,.28dp) $480
MX-17F 17" Digital NI (1280x1024,.28dp) $895

NEC

3V 15" Multi-Freq **Green EPA** (.28dp) $575
3FGe 15" Color Monitor (1024x768,.28dp) $625
4FGe 15" Multi-Freq (1024x768,.28dp) $740
5FGe 17" Multi-Freq (1024x768,.28dp) $1125
MultiSync 5FGP 17" (1280x1024,.28dp) $1480
MultiSync 6FGP 21" (1280x1024,.28dp) $2650

OPTIQUEST

800S 14" VGA (640x480,.39dp) $209
900S 14" SuperVGA (1024x768,.28dp) $252
1000S 14" SVGA NI (1024x768,.28dp) $275
1500D 14" Digital NI (1024x768,.28dp) $357
2000DX 15" Digital NI (1280x1024,.28dp) $375
2000DC 15" Digital NI (1280x1024,.28dp) $415
4000DS 17" Digital NI (1280x1024,.28dp) ... $690
4000DC 17" Digital NI (1280x1024,.28dp) ... $765

SONY.

CPD-1320 14" SVGA NI (640x480,.25dp) $357
CPD-1430 14" SVGA Multiscan NI (.25dp) $597
CPD-1730 17" SVGA Multiscan NI (.25dp) $1043
CPD-2036S 20" SVGA Multiscan NI (.30dp) . $1995

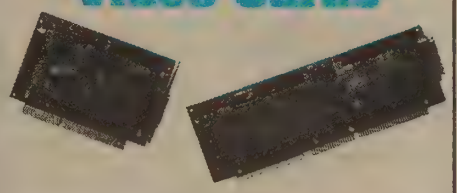
ViewSonic®

4E 14" SuperVGA (1024x768,.28dp) $273
6E 14" SuperVGA NI (1024x768,.28dp) $296
14E 14" SuperVGA NI (1024x768,70Hz,.28dp) ... $325
15E 15" Flat Screen (.28dp,76Hz refresh) $385

ViewSonic Monitors Continued

15 15" Digital Multi-Freq (.28dp,1280x1024) $459
7E 17" Digital Multi-Freq (1280x1024,.28dp) $748
17G 17" Digital Multi-Freq (.28dp,1280x1024) $798
17 17" Digital Multi-Freq (.28dp,1600x1280) $950
20 20" Digital Multi-Freq (.28dp,1600x1280) $1510
21 21" Digital Multi-Freq (.28dp,1600x1280) $1745

Video Cards



Mono/Graphics/Printer Card $14
AVGA-1 VGA Card w/256K $27
AVGA-3 (CL GD5422) 1MB Accelerator (16.7mil color) .. $70
Cirrus Logic GD5424 VLB Accelerator w/1MB $82
Cirrus Logic GD5426 VLB Accelerator w/1MB $90
Cirrus Logic GD5428 VLB Accelerator w/1MB $92
TVGA-9000 VGA w/256K (up to 512K) $32
TVGA-8900D 1MB SuperVGA Card (2x faster than) $64
TVGA-9200 VESA VLB 1Mb Accelerator Card $78
TVGA-9400 VESA VLB 1Mb Accelerator Card $90
WD-90C33 **VLB Accelerator** w/1MB $102
Paradise VL Plus **Accelerator** w/1MB $132
Tseng Lab W32i **VLB** 1Mb Accelerator Card $146

ATi

Graphics Ultra+ VLB mach32 w/1MB Dram $249
Graphics Ultra+ (1280x1024, 2MB Dram) $249
Graphics Ultra Pro (1280x1024 NI, 2MB VRam) $349
Graphics Ultra Pro EISA w/2MB VRAM $455
VLB mach32 Graphics Ultra Pro w/2MB VRam $380
Graphics Ultra PCI w/1MB $255

DIAMOND

SpeedStar Pro Graphics Accelerator w/1MB $112
SpeedStar Pro VLB Accelerator w/1MB $112
Stealth-24 ISA Windows Accelerator w/1MB $168
Stealth-24 VLB Windows Accelerator w/1MB $160
Stealth Pro Graphics Accelerator w/1MB VRam ... $260
Stealth Pro VLB Accelerator w/1MB VRam $260
Viper VLB Graphics Accelerator w/2MB VRam $370
BRAND NEW!! Stealth 32 PCI w/2MB $255
BRAND NEW !! VIPER *PCI w/2Mb VRAM* $445

ORCHID

Fahrenheit **Windows Accelerator** w/1MB $150
Fahrenheit **VLB Windows Accelerator** w/1MB ... $150
BRAND NEW!! Orchid KELVIN 64 VLB $190
BRAND NEW!! Orchid KELVIN 64 PCI $205

Controllers

High Speed AT I/O (2 Ser. 1 Par.) 16c550 Clone $35
AT Super IDE IO Adapter (Fdd/Hdd, 2S, 1P, 1G) $16
VESA Local Bus Super IDE & IO (2S,1P,1G) $30
PCI Local Bus Super IDE Adapter $38
BOCA I/O - 4 Serial & 2 Parallel ports $95
GSI-11V **2.88M** Four **(4)** Floppy Controller & Cable $55
GSI-18V **Co-resident IDE** Controller $42
GSI-21V **2.88M** Four **(4)** Fdd & IDE Adapter $62
GSI-32V **2.88M** Four **(4)** Fdd & IDE & I/O $118

Promise

DC-200 ISA IDE Caching (0K, upto 16MB) $100
DC-2040 ISA SCSI Caching (0K, upto 16MB) $265
DC-4030VL VLB IDE Caching (0K, upto 16MB) $145
DC-420 VLB IDE Caching (512K, upto 1MB) $150

Tekram DC-600B ISA IDE Caching (up to 16MB) $110
Tekram DC-680 VLB IDE Caching (up to 16MB) $145

Controllers

Controllers

Bus Logic KT445S VLB SCSI Controller Kit $275
Bus Logic KT545S ISA FAST SCSI-2 Kit $235
Bus Logic KT747S EISA FAST SCSI-2 Kit $355

DTC-2278 VLB IDE FDD/HDD Controller $38
DTC-2290 **EISA** IDE Floppy/Hard Disk $118
DTC-3270VL VLB SCSI-2 Controller $130
DTC-3290 **EISA** SCSI **Caching** FD/HD (0K,to 4MB) .. $435
DTC-3292 **EISA** SCSI FD/HD Controller $325

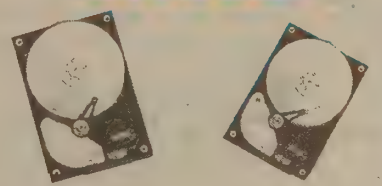
UltraStor 14FA SCSI FD/HD Controller $210
UltraStor 14FA SCSI FD/HD Controller Kit $250
UltraStor 24F **EISA** SCSI FD/HD Controller $370
UltraStor 24F **EISA** SCSI FD/HD Controller Kit .. $410
UltraStor 34F **VESA Local Bus** SCSI FD/HD $285
UltraStor 34F **VESA Local Bus** SCSI FD/HD Kit $325

Future Domain 1680SVP 16-bit SCSI Fdd/Hdd Kit . $145

Adaptec®

AHA-1522 SCSI Controller (Card Only) $89
AHA-1542C SCSI Bus Mastering (Card only) $205
AHA-1542CK SCSI Bus Master Host Adapter Kit $257
AHA-1542CK + SCSI Bus Master Host Adapter Kit .. $320
AHA-2742AK **EISA** SCSI Bus Master Adapter Kit $370
AHA-2842AK **VLB** SCSI Bus Master Kit $305

Drives



TEAC 1.2MB FDD (5.25") $54
TEAC 1.44MB FDD (3.5") w/Mounting Kit $45
TEAC 2-in-1 1.2/1.44MB FDD $118
TEAC 2.88MB FDD (3.5") w/Mounting Kit $87
Toshiba 1.2MB FDD (5.25") $52
Toshiba 1.44MB FDD (3.5") w/Mounting Kit $43
Toshiba 2.88MB FDD (3.5") w/Mounting Kit $73
IOmega Floptical Drive w/SCSI Interface (21MB) $429
IOmega Floptical Disk (21MB) $27

CONNER

The Storage Answer.

CP-30174E 170MB IDE HDD (17ms) $215
CP-30170E 170MB SCSI HDD (17ms) $230
CPS-210A 210MB IDE HDD (14ms,) $228
CP-30254H 250MB IDE HDD (14ms) $245
CPA-340A 340MB IDE HDD (14ms) $290
CPA-420A 420MB IDE HDD (14ms) $350
CPA-540A 540MB IDE HDD (12ms,256K cache) ... $445
CP-30540 545MB Fast SCSI-2 HDD (12ms) $570
CP-1060S 1.06Gb Fast SCSI-2 HDD (9ms) $895
CP-31370 1.37Gb Fast SCSI-2 HDD (10ms) $1070

FUJITSU

M2624T 520MB IDE HDD (12ms, 5yr warranty) $495
M2624FA 520MB SCSI HDD (12ms, 5yr wrnty) $575
M2694SA 1.2GB SCSI HDD (10.5ms,5yr wrnty) ... $940
M2652S 2.0GB SCSI HDD (12ms, 5yr warranty) . $1590
M2654S 2.4GB SCSI HDD (12ms, 5yr warranty) . $1650

Maxtor®

Maxtor MX-7245A 245MB IDE HDD (14ms) $254
Maxtor MX-7245S 245MB SCSI HDD (14ms) ... $265
Maxtor MX-7345A 345MB IDE HDD (14ms) $305
Maxtor MX-7345S 345MB SCIS HDD (14ms) ... $355
Maxtor MX-540A 540MB IDE HDD (8.5ms) $455

Drives Continued

Quantum™

Brand New! ProDrive 270Mb & 340Mb IDE
ProDrive ELS 170MB IDE HDD (17ms, 2yr wrnty) .. $190
ProDrive LPS 240MB IDE HDD (15ms, 256K) $245
ProDrive LPS 270MB IDE HDD (13ms, 128K) $250
ProDrive LPS 342MB IDE HDD (13ms, 128K) $290
ProDrive LPS 541Mb IDE HDD (13ms, 128K) $450
ProDrive LPS 240MB SCSI HDD $265
ProDrive 1080S 1080MB SCSI-2 HDD (5yr wrnty) .. $895
ProDrive 1225S 1225MB SCSI-2 HDD (5yr wrnty) . $985
ProDrive 1800S 1.8GB SCSI-2 HDD (5yr wrnty).....$1195

WESTERN DIGITAL

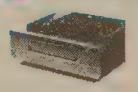
Western Digital AC1200 209MB IDE HDD (13ms) . $230
Western Digital AC2250 250MB IDE HDD (13ms) . $250
Western Digital AC2340 340MB IDE HDD (13ms) . $290
Western Digital AC2420 420MB IDE HDD (13ms) $345
Brand New! WD AC2540 540Mb IDE HDD $440

****** Please call for Micropolis, Seagate, & Toshiba Hard Disk Drives prices***

SyQuest

SQ555 44MB SCSI Removable Disk Drive ..... $265.
SQ5110C 88MB SCSI Removable Disk Drive ..... $320.
SQ3105 105MB IDE Removable Disk Drive (3.5") ... $320.
SQ3105 105MB SCSI Removable Disk Drive (3.5") $425.
SQ3105 105MB IDE Int. Removable Disk Kit ..... $350.
SQ3105 105MB Ext. IDE Removable Disk Drive .... $430.
SQ400 44MB Cartridge ..... $75.
SyQuest SQ800 88MB Cartridge ..... $108.
SyQuest SQ310 105MB 3.5" Cartridge ..... $72.
SyQuest SQ01 SCSI Adapter w/Software ..... $45.
SCSI External Case for SyQuest 5.25" Disk Drive .... $95.

Tape Backups

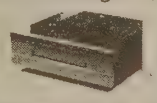


CONNER

The Storage Answer.

Conner TapeStor 250MB Tape Backup w/One Pre-formatted Cartridge ..... $159.
Conner TapeStor 250MB **External Parallel Port** Tape Backup w/One Pre-formatted Cartridge .... $335.

COLORADO MEMORY SYSTEMS INC.



Colorado JT-10 120MB **Parallel Port** External .. $305.
Colorado JT-20 250MB **Parallel Port** External .. $349.
Colorado DJ-10 120MB Internal Tape Backup .. $109.
Colorado DJ-20 250MB Internal Tape Backup .. $179.
Colorado AB-11 External Adapter Kit ..... $32.
Colorado KE-09 External Drive Kit ..... $69.
Colorado FC-10 500Kb/s-1Mb/s Adapter Kit ..... $70.
Colorado TC-15 Data Compression Adapter Kit $149.
Colorado Int. Power Tape 2.0GB Tape Backup .. $985.
Colorado Int. Power Tape 4.0GB Tape Backup .. $1480.
Colorado Ext. Power Tape 2.0GB Tape Backup . $1125.
Colorado Ext. Power Tape 4.0GB Tape Backup . $1620.

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ESSENCE GROUP

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Fountain Valley, CA 92708

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FAX (714) 580-6996
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Irvine, CA 92718

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Multi-Media Systems

Harmony IIIC Multimedia Power Kit **$328**
- Panasonic or Mitsumi Double Speed CD-ROM 320ms
- Harmony 16Bit Stereo Sound Card
- 5 CD titles - Reference Library, US Atlas, World Atlas, Mavis Beacon's Typing, & Chessmaster 3000

Harmony IIIA Multimedia Kit **$435**
- Panasonic CR-562B Internal Double-spin, Multi-session CD-ROM - 320ms, 300kb/s Data transfer rate
- Sound Blaster 16 Stereo Sound Card - 16bit Sound
- 7 CD titles - MPC Encyclopedia, US Atlas, World Atlas, King's Quest V, Mixed Up Mother Goose, Tempra Photo CD, & Sherlock Holmes Consulting Detective
- A Microphone & a pair of Mini Speakers

MITAC

Mitac Multimedia Deluxe Upgrade Kit **$395**
- Mitsumi Internal FX001D CD-ROM (250ms, Kodak Photo CD compatible, Double Speed 300k Transfer)
- Sound Galaxy 16 DSP PRO Sound Card
- Shielded Stereo Computer Speakers
- Software bundled: Compton's Multimedia Encyclopedia for Windows, The KGB/CIA World Factbook, Dictionary of the Living World, Mayo Clinic, Dinosaurs

CREATIVE
CREATIVE LABS, INC.

Creative CD Mullt-Media Karaoke Kit (Internal) **$399**
- **Sound Blaser Pro** Stereo Sound Card
- Creative Labs Internal CD-ROM (Panasonics CD-ROM), 64KB Buffer, Double Speed 300KB/sec Data Transfer, 320ms Access rate, Photo CD compatible
- A pairs of Stereo Speakers
- Software bundled: Multimedia Encyclopedia, The ... Animals!,Secret of Monkey Island,Loom, 3 Karaoke CD's

Discovery CD 16 Upgrade Kit (Internal) **$445**
- **Sound Blaster 16** Stereo Sound Card
- Creative Labs Internal CD-ROM (Panasonics CD-ROM), 64KB Buffer, 300KB/sec Data Transfer, 320ms Access rate, Photo CD compatible
- A pairs of Stereo Speakers
- Software bundled: Multimedia Encyclopedia, The ... Animals!, Aldus PhotoStyler SE, Just Grandma & Me, Where in the World is Carmen Sandiego - Deluxe

Edutainment CD 16 Upgrade Kit (Internal) **$505**
- **Sound Blaster 16** Stereo Sound Card
- Creative Labs Internal CD-ROM (Panasonics CD-ROM), 64KB Buffer, 300KB/sec Data Transfer, 320ms Access rate, Photo CD compatible
- A pairs of Stereo Speakers
- Software bundled: Multimedia Enclopedia, The Secret of Monkey Island, Loom, Secret Weapons of the Luftwaffe, Sherlock Holmes - Consulting Detective Aldus PhotoStyler SE, Indianapolis 500, Lemmings

MEDIA VISION

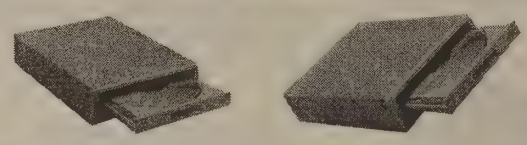
Fusion DoubleCD 16 (Internal) **$525**
- NEC CDR-55J Internal CD-ROM Drive - 350ms
- Media Vision Pro Audio 16 Stereo Sound Card
- High-quality Labtec Amplified Speaker System
- Software bundled: 7th Guest, Battle Chess, Compton Interactive Encyclopedia, Arthur's Teacher Trouble

Pro-16 Multimedia System II (Internal) **$795**
- NEC CDR-84 Internal SCSI CD-ROM (Multi-Session, 280ms)
- Media Vision **Pro Audio Studio 16** Stereo Sound Card
- Software bundled: Carmen San Diego, Compton's Encyclopedia, Lotus 1-2-3, King's Quest V, Nautilus CD, and MacroMind Action! CD

HI-Lite Toshiba Bundle **$495**
- Toshiba 3401B Internal SCSI CD-ROM (300Kb/s, 200ms)
- Media Vision Pro Audio Spectrum 16 Stereo Sound Card

HI-Lite Sony Bundle **$299**
- Sony 33A 2X Internal SCSI CD-ROM (300Kb/s, 320ms)
- Media Vision Pro Audio Spectrum 16 Stereo Sound Card

CD-ROMs



Mitsumi FX001D Int. CD-ROM (Double Speed,250ms) **$195**

NEC

NEC CDR-55 Int. OEM SCSI CD-ROM (350ms,300k,) **$219**
NEC CDR-74J-1 External SCSI CD-ROM (280ms) **$439**
NEC CDR-84J-1 Int. SCSI CD-ROM (280ms OEM) **$279**
NEC CDR-510 Int. 3X Speed CD-ROM (195ms,450K) ... **$459**
NEC 3XI Internal 3X Speed CD-ROM (195ms,450K) **$515**
NEC 3XE External 3X Speed CD-ROM (195ms,450K) **$605**
NEC 3XP Portable 3X Speed CD-ROM (220ms,380K) ... **$485**

Panasonic Office Automation

Panasonic CR-522-B Int. CD-ROM w/Interface **$159**
Panasonic CR-563 Int. CD-ROM (Double spin) **$179**
Panasonic CR-563 Int. CD-ROM (Double spin) w/Interface **$215**

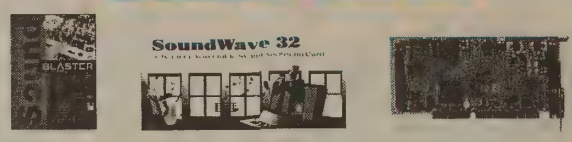
SONY

SONY CDU-33A Internal CD-ROM (300k,300ms) **$179**
SONY CDU-33A Internal CD-ROM w/Interface **$289**

TOSHIBA

Toshiba 3401B Int. SCSI CD-ROM 300k, 200ms,OEM . **$369**
Toshiba 3401B Int. SCSI CD-ROM 300K, 200ms **$379**
Toshiba 3401E Ext. SCSI CD-ROM 300K, 200ms **$509**

Sound Cards



CREATIVE
CREATIVE LABS, INC.

Creative Lab Sound Blaster Deluxe **$78**
Creative Lab Sound Blaster Pro Deluxe **$118**
Creative Lab Sound Blaster 16 Basic **$138**
Creative Lab Sound Blaster 16 MCD **$168**
Creative Lab Sound Blaster 16 MCD ASP **$198**
Creative Lab Sound Blaster 16 SCSI II **$188**
Creative Lab Sound Blaster 16 SCSI II ASP **$208**
Creative Lab Video Blaster w/Microsoft video for Win ... **$355**
Creative Lab Video Spigot video capture card **$295**

MEDIA VISION

Media Vision Pro Audio Spectrum 16 Basic **$149**
Media Vision Pro Audio Spectrum 16 Sound Card **$169**
Media Vision Pro Audio Studio 16 Sound Card **$229**
Media Vision Pro Movie Spectrum Video Capture card **$325**

ORCHID

Orchid GameWave 32 (Wavetable DSP) **$159**
Orchid SoundWave 32 (Advanced Wavetable DSP) **$229**

Speakers & Accessories

Creative Labs CT-38 Amplified Stereo Speakers **$26.50**

Labtec.

AM-22 Deluxe Microphone **$13.95**
C-10 Computer Stereo Headphone **$14.95**
CS-150 Shielded Amplified Stereo Speakers **$19.50**
CS-180 Shielded Amplified Stereo Speakers **$18.50**
CS-550 Shielded Amplified Stereo Speakers **$27.50**
SS-700 Shielded Amplified Stereo Speakers w/3 Band EQ .. **$32.50**
CS-800 Shielded Amplified Stereo Speakers w/AC Adapter . **$38.50**
SS-1000 Shielded Amplified Stereo Speakers **$88.00**
AD-4 400mA AC Adapter (for Speakers System) **$9.95**

CD Titles

Pricing So Low We're Not Allowed To Print Them!
Most Titles $14. to $27.

BUSINESS

Bus. Phone Book - 1992 (DOS)
Authorware Star (MPC)
Busines & Economy Atlas (DOS)
Kodak Photo CD (MPC)
Lotus 1-2-3 V3.1 (MPC)
Macromind Action (MPC)
Marketing Master 1992 (DOS)
Microsoft Works (MPC)
Publish It 2.0 (DOS)
TEMPRA Access Photo CD Imaging Software (DOS)

EDUCATION

Animals! (MPC)
Annabel's Dreams (MPC)
Arthur's Teacher Trouble (MPC)
Audubon's Mammals (DOS)
Audubon's Birds (DOS)
Barron's College Guide (MPC)
Bring the World Your Senses (DOS)
Carmen San Diego (DOS)
Choose your College
Collection of PC Graphics (DOS)
Composer Quest (MPC)
Compton's Encyclopedia (MPC)
Corp Snapshot (DOS)
Dictionary of the Living World (MPC)
Dinosaur Adventure (MPC)
DTP Pro FM - Wave Clipart
Electronic Home Library (DOS)
Family Choice / Britannica (DOS)
Family Doctor (DOS/MAC)
Family Education Collections (DOS)
Great Cities - Vol. 1 (DOS)
Great Cities - Vol. 2 (DOS)
Jets & Props - Arls (MPC)
Language of the World (Windows)
Library of Future 1st (DOS)
MacMillan Child Dictionary (MPC)
Mavis Beacon TeachesTyping (MPC)
Media Clips-Jets,Props,Place (MPC)
Microsoft BookShelf (MPC)
National Geographic Mammals (DS)
National Parks (DOS)
Ocean Digital Imagery V1 (DOS)
Playing Language - English (DOS)
Playing Language - French (DOS)
Playing Language - Germany (DOS)
Playing Language - Japanese (DOS)
Playing Language - Spanish (DOS)
Presidents (DOS)
Renaissance Master I (MPC)
Renaissance Master II (MPC)
Illustrated Works of Shakespeare
Sleeping Beauty (MPC)
Sound Library (MPC)
Survey of Western Arts (MPC)
TIME Almanac - 1991 (DOS)
Time Table of History (DOS)
Toolworks Encyclopedia (MPC)
Toolworks Reference Library (DOS)
U.S. Atlas & Automap (DOS)
Atlas Pak - US / World Atlas (DOS)
U.S. Histroy (DOS)
USA Wars: Civil War (DOS)
USA Wars: Desert Storm (MPC)
USA Wars: Korea (DOS)
USA Wars: World Wae II (DOS)
USA Wars: Vietnam (DOS)
Vital Signs (MPC)
Whale of Tale
Wild Places (DOS)
WinWare Vol 3
World View (DOS)

ENTERTAINMENT

Amanda Stories (MPC)
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Beauty & Beast (MPC)
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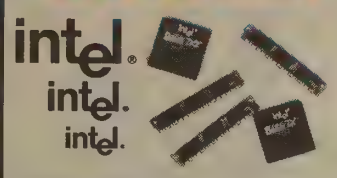
CPU's & RAM



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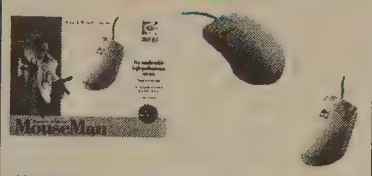
External 192/144 Full Duplex Modem & 14.4 S/R Fax $340

Call for any other specific modems not listed in this add!

Mice



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MouseMan Bus Version $70
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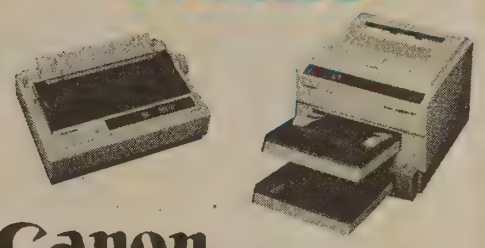

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Canon BJ-300 Bubble Jet Printer $333
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Canon BJC-820 Color Bubble Jet Printer (Wide) $1647
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Citizen GSX-220 Quiet Printer (24pin/color option) $185
Citizen GSX-230 Quiet Printer (24pin/270cps/color option) $226
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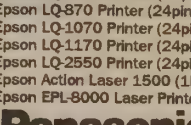

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Panasonic KX-P3124 Quiet (24pin/320cps/80col/color opt.) $369
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Hewlett Packard LaserJet 4P Laser $945
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CS-330 Mini Vert Case w/220W UL P.S. (2x5.25",3x3.5",Dig.) $81
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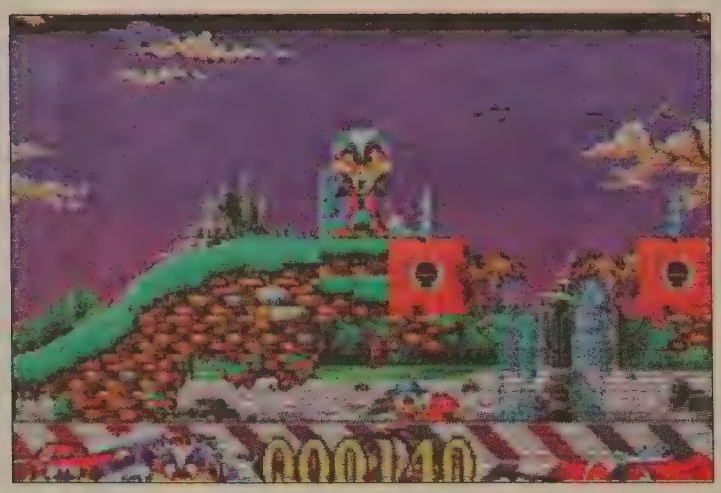
Amiga CD32

Commodore's New Game Box Also Plays Movies

BY DOUGLAS J. NAKAKIHARA

As expected, Commodore officially introduced the Amiga CD32 to the US market at the Consumer Electronics Show, held last month in Las Vegas.

CD32 is based on the custom Amiga AGA chip set and is powered by a 32-bit Motorola 68EC020 processor running at 14MHz. Two megabytes of RAM and 1K of nonvolatile memory (for saving game high scores, etc.) is standard. The built-in double-speed multisession CD-ROM drive is accessible via a pop-up lid and does not require a disc caddy. CD32 delivers up to 256,000 colors out of a palette of 16.7 million and features four-channel 8-bit Amiga and full 16-bit CD audio. The suggested retail price is amazingly only $399!



External connectors include stereo audio, S-video, RF and composite video, stereo headphone (with volume control), keyboard/auxiliary, and two joystick/mouse ports. Except for the keyboard jack, CD32 does not have computer-type ports. However, future options may make it possible to turn it into a full-blown computer via its special expansion slot. This slot may also be used for cable and satellite TV interfaces. (CD32 add-ons for the Amiga 1200 and 4000 are planned.)

Right out of the box, CD32 can play CD32 and some CDTV titles, standard audio CDs, CD+G, and CD+MIDI (the unit lacks a MIDI port, however). Kodak PhotoCD support is due shortly. The new movie CD formats, VideoCD and Digital Video, are supported, but require an optional module.

THE COMPETITION

After years of trying to deny that the Amiga was really "just" a game machine, Commodore has turned the tables and created a game machine that is really "just" an Amiga. CD32 is aimed squarely at the market currently dominated by the Nintendo and Sega game consoles. Compared to CD32, these 16-bit old-timers are underpowered and unexpandable. Furthermore, only Sega is currently offering CD-ROM capability with an add-on device, which brings its total cost to nearly the same as CD32's.

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101-key enhanced keyboard
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MS-DOS 6.2 w/ disks & guide

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32-bit VL-bus SVGA card w/1MB DRAM, accelerator
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101-key enhanced keyboard
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16-bit SVGA card w/256K DRAM
101-key enhanced keyboard
Mini tower case w/230W UL P/S
MS-DOS 6.2 w/ disks & guide

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From VESA w/9-bit SIMMs to VESA w/EISA (max=128MB)--add **$175**
Memory:
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Cache RAM: From 256K to 512K--add **$170**
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From 170MB to 245MB--add **$55**
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Other IDE drives--call for prices
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SCSI--call for prices
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I/O cards:
I/O with 16550 UART--add **$45**
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From Shamrock 14" I (.39dp) to 14" N/I (.28dp)--add **$ 65**
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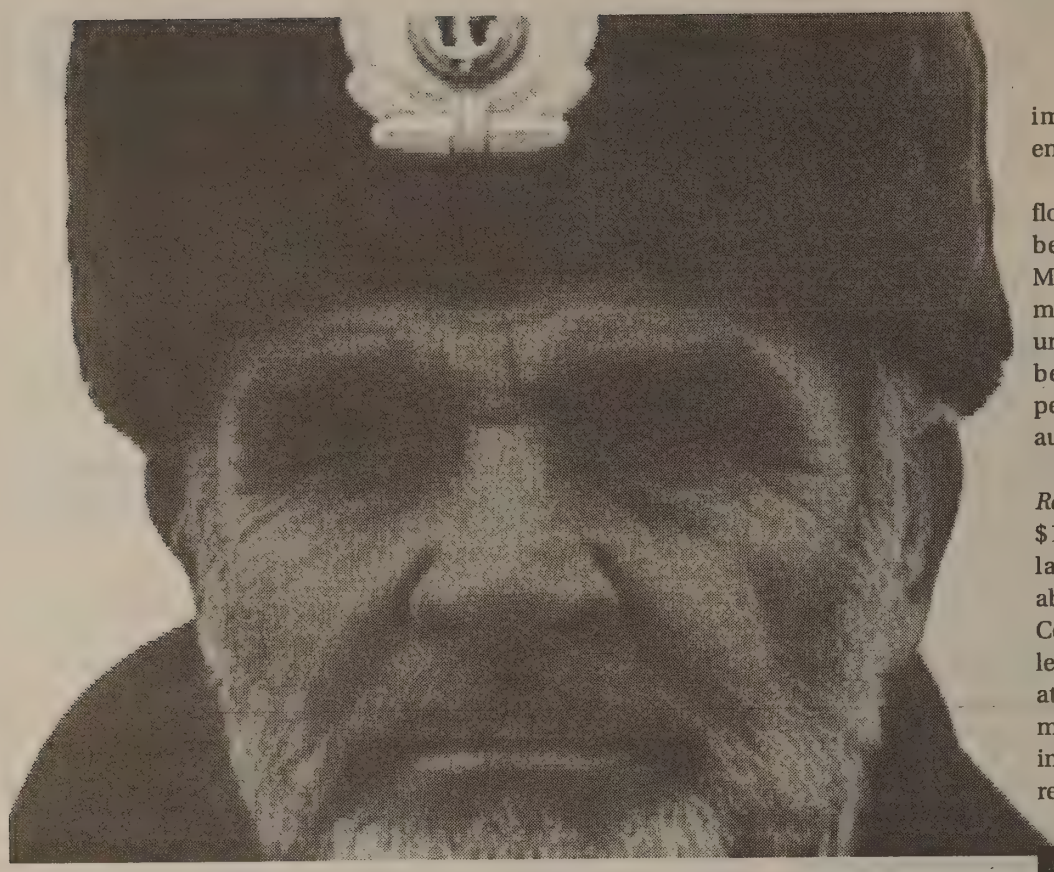

Also on the market is Philips' CD-I. Philips has been trying to get the public to bite the CD-I pie for years with very little success. It has become old technology with very limited capabilities. As such, CD-I is not a serious contender in the games console market.

Atari Jaguars are beginning to appear at stores, but software availability is extremely limited. Whether or not Atari can attract developer support will be key to Jaguar's survival. A CD add-on is supposedly due out this year.

It's difficult to say what about Panasonic's new 3DO machine will make your jaw drop farther: the awesome graphics or its $699 price tag! I'm inclined to believe that 3DO is just a little too pricey to really take the market by storm. Neo-Geo tried this with a high-priced arcade-quality game console that ultimately failed. There's obviously a limit on how much people will pay to play games.

MOVIES ON CD

Commodore has an ace up its sleeve in the form of an optional MPEG module that plugs into the expansion port. (MPEG [pronounced em-peg] refers to the method used to compress the video.) This device, at a suggested retail price of $250, expands CD32's home entertainment potential by allowing you to play full-length movies from discs the same size as audio CDs! These movie CDs, called VideoCDs, have a capacity of 74 minutes, which means a normal length movie will require two disks. Reportedly, the companies supporting the VideoCD format include Goldstar, JVC, Matsushita Electric, Philips, Samsung, Sigma Designs, and Sony. (Note: VideoCD capability will reportedly be a future option for 3DO and Jaguar.) An exciting feature is that MPEG video can also be integrated into CD32 applications just like any other Amiga animation.

A nearly identical format from Philips for their CD-I machine is Digital Video, which can also be played on a CD32 with the MPEG module. Currently, these are the only movie CDs being sold. Some of the available movies are *Hunt for Red October, Star Trek VI, Black Rain, Fatal Attraction, Patriot Games, Sliver, The Firm*, and *Top Gun.*

THUMBS UP [AND DOWN]

It has been reported that the picture quality of movie CDs is better than VHS tape, but poorer than laserdiscs. After viewing a movie using CD32, I agree that the picture quality is not up to laserdisc standards. The claim that picture quality is superior to VHS tape, however, is subject to debate.

Movies on VHS tape have an overall graininess, which doesn't really stand out as a defective picture. Although a movie CD picture is generally sharper than VHS tape, tiny artifacts are sometimes visible, especially in dark scenes. However, paused video and single frame advance are exceptionally clear. I suppose that by any electronically measurable means, the movie CD picture quality is better; however, your eyes may not totally agree.

Despite the slight imperfections of movie CDs, the picture is very watchable and I think the medium could catch on. Apparently, compressing a movie with MPEG is as much of an art as it is a science, and picture quality should improve as developers get better at encoding the video.

Just as prerecorded cassette tapes have flourished despite their inferiority to CDs, I believe movie CDs can prosper as well. Music videos should be a natural for this medium, especially if some sort of portable unit becomes available. People can choose between watching their favorite artists perform or just listening to the CD-quality audio.

The discs are priced right too. A *Hunt for Red October* Digital Video CD only cost me $19.99! Substantially cheaper than laserdiscs which run around $35, and about the same price as many VHS movies. Considering how scarce these discs are—at least for now—I was pleasantly surprised at how inexpensive they were. They've also managed to squeeze the movie's two discs in a double-sided case the same size as a regular audio CD's.

CDXL

CDXL is a method by which data is transferred from a CD directly to display memory, without CPU involvement. The result is impressive partial-screen full-motion video from a CD without any add-on hardware. This allows developers for, say, games based on movies to include actual movie clips right in the game. An example of this was demonstrated for an upcoming game based on the movie *Jurassic Park.*

EASY DEVELOPMENT

Since CD32 games are essentially Amiga games on CD-ROM, development tools are mature and inexpensive. Virtually anyone with an AGA Amiga and a large hard drive could easily develop software for CD32. There is even an '020 board and CD-file performance software to help simulate CD32 performance on an Amiga 4000.

Commodore has garnered tremendous developer support and expects to have eighty-fivetitles available by the time it goes on sale in the US. My evaluation unit came with fifteen titles, far more than I've seen for 3DO and Jaguar which are already shipping.

Also, propelling companies to jump on the CD32 developer bandwagon is the fact that Commodore only charges a licensing fee of $3 for every game sold. The norm for this type of arrangement with other game console platforms is reportedly a fee for every unit manufactured.

Aside from the benefits that Commodore is offering, the CD medium itself is very attractive to developers because it allows them to exercise greater inventory management and has lower manu-

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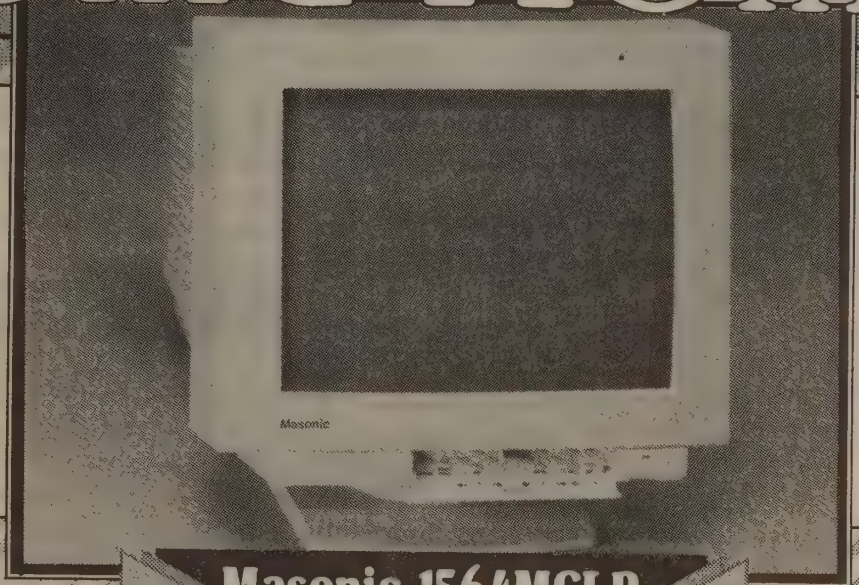

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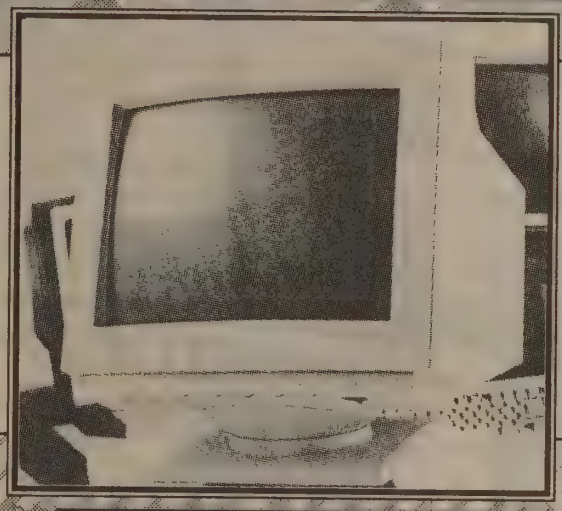

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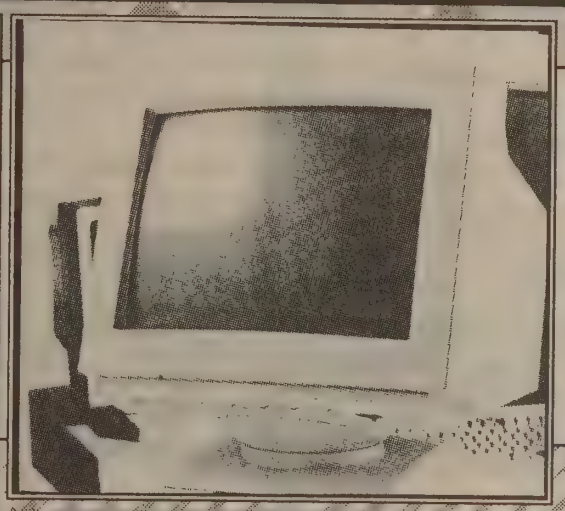

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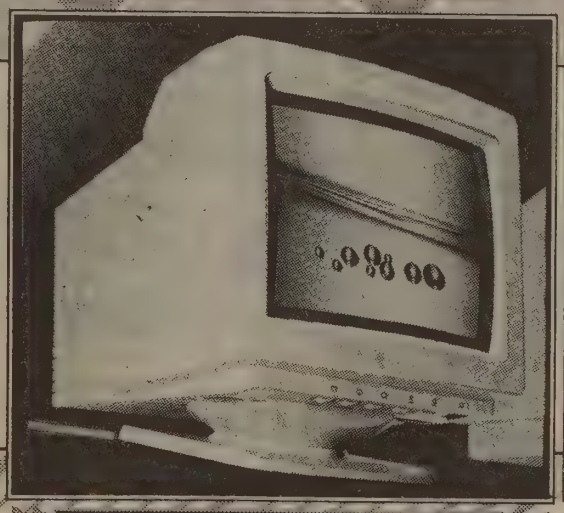

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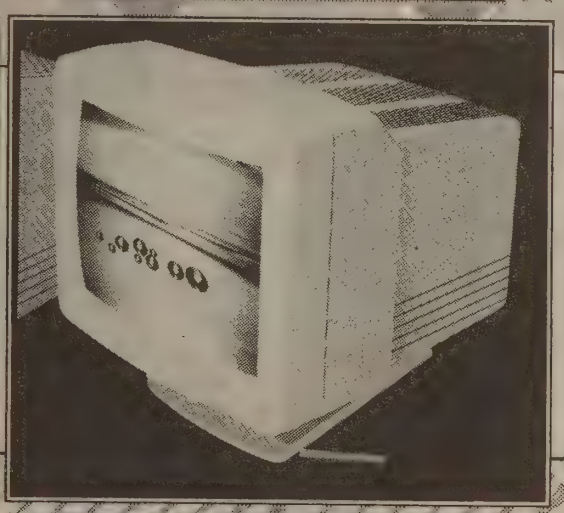

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facturing costs. Because CD pressing services are quicker and more readily available compared to cartridge manufacturing services, companies can afford to keep minimal inventories on hand and order on an as-needed basis. In addition, the per-unit manufacturing cost of a CD can be less than a dollar, while game cartridges can be over $10. CD32 titles are already being sold at prices 30 to 40% lower than game cartridges.

HANDS ON

The multi-button controller is very well designed and operates excellently. Two of the buttons are located on the side of the controller and are easily manipulated with your index fingers. The rocker-style directional button is smooth and responsive. The controller is very similar to Super Nintendo's, but slightly larger and much more ruggedly constructed.

Games loaded fairly quickly—not as fast as a cartridge ROM, but substantially faster than a floppy disk. Although the discs I received appeared to be enhanced versions of previously released Amiga titles—not surprising for the initial offerings—consumers not already familiar with the Amiga will be extremely impressed. Moreover, some really incredible games are forthcoming, written specifically for the platform. A demo disc provided a preview of a ground-breaking shoot-'em-up game called Microcosm from Psygnosis, filled with awesome 3-D animations.

Arcade action games will make or break CD32. Two in particular that came with my unit, Gremlin's "Zool—Ninja of the Nth Dimension" and Flair's "Oscar," have the potential of becoming what Mario Bros. and Sonic the Hedgehog are to Nintendo and Sega. This type of association is very important: it personifies the hardware, which helps with consumer awareness. Commodore really needs to capitalize on this, by getting some type of exclusive licensing agreement with the makers of Zool or Oscar.

Grolier's Encyclopedia is also available for CD32, with 400MB of data comprising the 21-volume encyclopedia. Over two thousand photographs and illustrations, and high-quality audio are featured, including excerpts from famous speeches and musical compositions.

SOMETHING FOR EVERYONE

After playing with the unit for a few weeks, I am convinced that Commodore has a potential hit on its hands—this is an exciting product!

For the game players, CD32 offers graphics performance far superior to Nintendo and Sega. With educational and reference titles, the ability to play standard audio CDs, and the optional capability of playing movies, parents can find comfort in knowing that CD32 is more than just a game machine. While adding a CD-ROM to a personal computer may provide similar benefits, PCs lack the graphics power of the Amiga. Moreover, adding a CD-ROM and soundcard to a PC will probably cost more than CD32.

Of course the initial investment cost will be an issue with consumers. However, with game cartridges selling for around $60 and

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initial CD32 titles for about $39, people need to look further down the road. Forgetting for a moment the benefits of the CD medium and the superiority of the CD32 hardware, although you can get Sega or Nintendo consoles for around $100, simple math will tell you that you'll make up the initial cost difference after purchasing only ten to fifteen titles.

CD32 would also be very cost-effective for kiosks as well as educational and training video distribution. As mentioned above, you'd pay more for a PC-based system and get less performance. Remember, CD32 can be connected to an ordinary TV right out of the box; PCs can't. Moreover, PC animations I've seen played off a CD pale by comparison to CD32 CDXL animations, and MPEG video is like watching TV.

MARKETING

It is expected that CD32 units will be available for purchase by the end of March. However, so far, there has been no official word on how CD32 will be marketed.

Commodore is supposedly trying to get retailers that have the capacity for in-store demonstrations and shying away—for now—from mass marketers. Blockbuster and West Coast Video stores have been suggested as possibilities. Marketing on the QVC network may also be a candidate. This is a smart move for a company with a limited advertising budget. Without heavy TV promotion, simply putting CD32 on retailer's shelves could taint the product in the eyes of dealers if sales are sluggish.

CD32 is already the best-selling CD-based game machine in England, after only a few months on the market. In the US, the trick will be to get the public interested enough to actually go out and see one. This also means that Commodore has to get some reasonable level of retailer support.

I believe that kids will be quick to embrace CD32, as they generally exhibit little product loyalty. CD32 is a solid performer with an amazingly low price tag. However, with the increasing number of competing platforms, its market is going to be a battlefield.■

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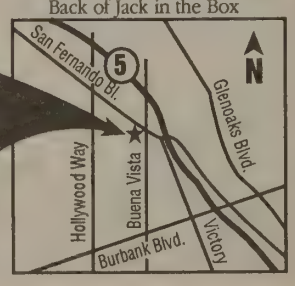

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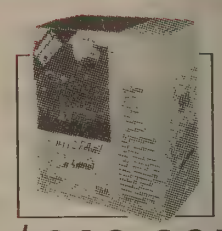

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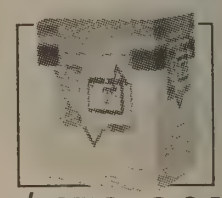

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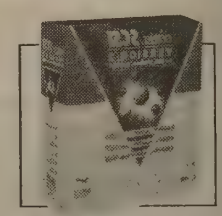

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The CD-ROM manufacturers have been doing well in the past few months even without the overhyped multimedia market. Many PC manufacturers are selling multimedia PCs with CD-ROM drives, of course, but many are also selling CD-ROM drives on standard mid-range machines. These machines aren't really multimedia PCs because they don't have sound cards, and some don't even have accelerated graphics, but they do prevent PC users from having to install an internal CD-ROM drive, which could be quite a painful task.

Some PC manufacturers are taking advantage of this situation by putting Windows on CD-ROM as well as preloading it on the hard drive. An unfortunately large number of people have to reload Windows after it was first installed, otherwise the hard disk gets corrupted. Reloading Windows from CD-ROM takes about two minutes; reloading from diskettes takes at least ten minutes and takes lots of disk changes.

If more software manufacturers start putting their software on CD-ROM (particularly large Windows programs that take ten or more diskettes), people with CD-ROM drives will definitely appreciate them more, and may even be willing to pay a bit more for them. ■

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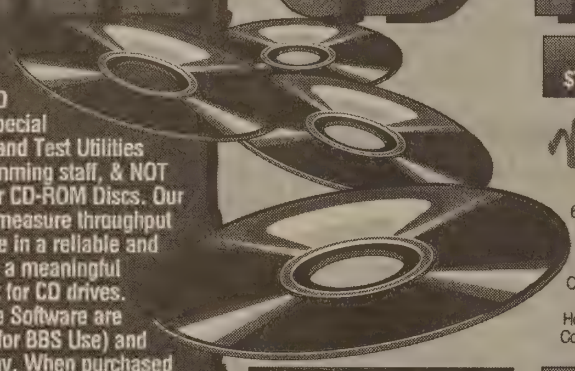

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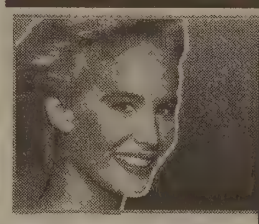

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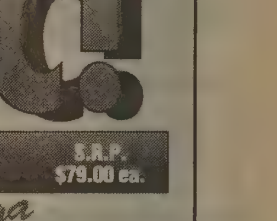

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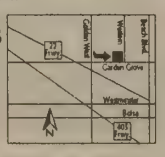

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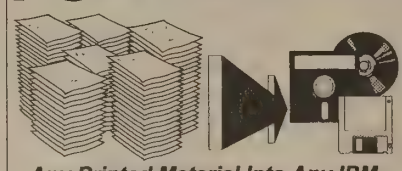

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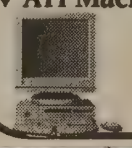

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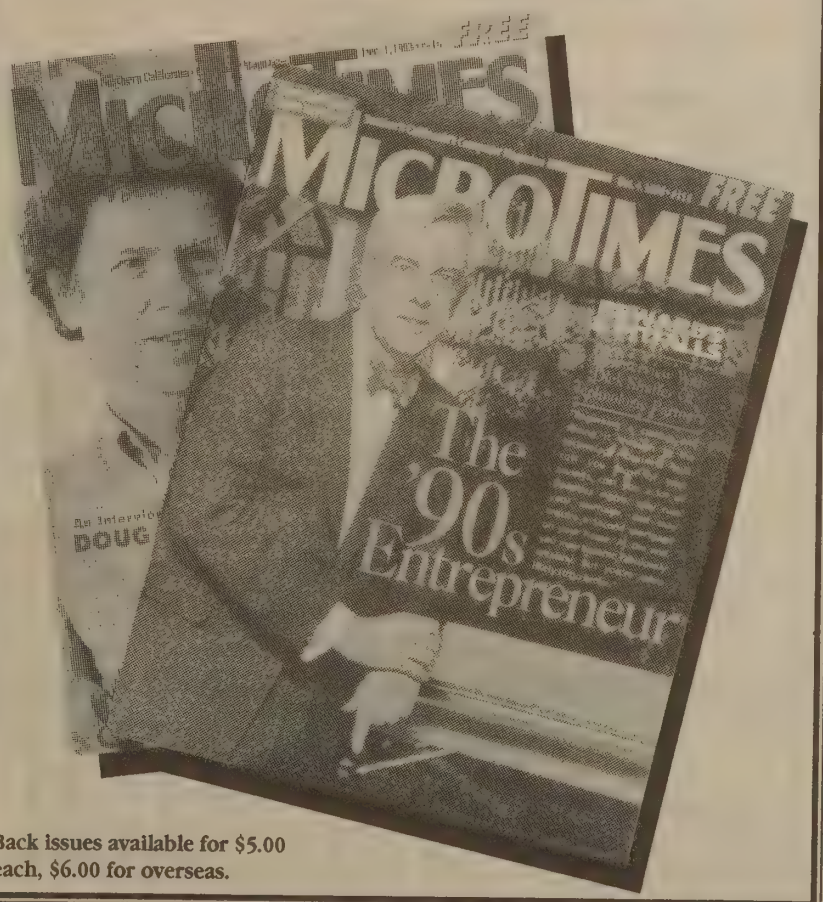

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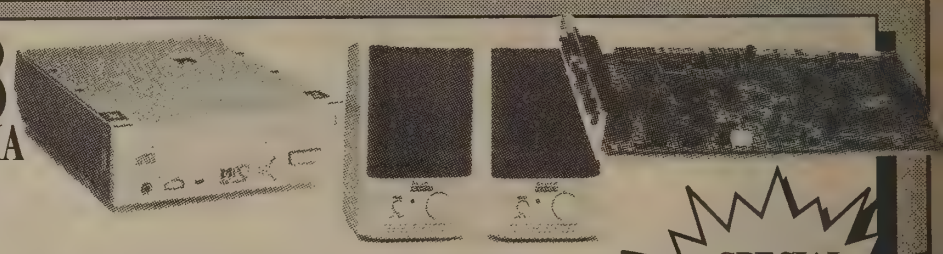

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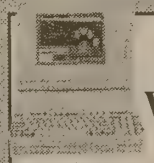

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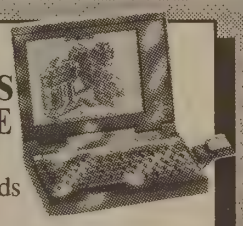

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ADVERTISERS INDEX

20/20 TECHNOLOGIES 26
3-6 COMPUTERS 157
A-1 COMPUTERS 152,153
ABI COMPUTER 140,141
ACI, AMERICAN COMPONENT INT'L 108
ACP SUPERSTORE 55,174
ADCON COMPUTER SYSTEMS 138
ADVANCE PRO TECHNOLOGY 65
ADVANCED COMPUTER & TECHNOLOGY 59
ADVANCED COMPUTER CENTER 122
AIC COMPUTER 52
ALCOM SYSTEMS 189
ALPHA DATA RESEARCH 129
ALPHA INTERNATIONAL 131
AMERICAL GROUP 3
ANNEX TELECOMMUNICATIONS 156
ANSON GROUP 129
ANTHURIUM TECNOLOGY CO 124
ARRAY CAD SYSTEMS, INC. 51
ASEAN COMPUTER TECHNOLOGIES 148,149
ATC 56,57
ATS 69
AUTHORIZED TECHNICAL SERVICES 151
BASON COMPUTER / TRADE TEK 188
BINOMIAL SYSTEMS 47
CALIFORNIA COMPUTER SYSTEMS 119–121
CARROT COMPUTER 93
CD-DOSSIER 43
CERTIFIED NETWORK EDUCATORS 69
CITICOM COMPUTER, INC. 39
CMOS 186
COMPU NET SOLUTIONS 131
COMPUHELP COMPUTERS 178
COMPUTEK 24,25
COMPUTER BUSINESS CENTER 184,185
COMPUTER LIQUIDATION CENTER 134
COMPUTER MARKETPLACE 143,159
COMPUTER MAX 139
COMPUTER PACER 19
COMPUTER PLAZA 64
COMPUTER SUPPLY CLUB 48
COMPUTER SWAP 32
COMPUTERLANE, INC. 85
COMPUTIX 165
COMPUTOPIA, INC. 21
COMTRADE 136,137
CORPORATE SYSTEMS CENTER 13
CREATIVE COMPUTERS 7
CRL 84
CYGMA COMPUTER 60
D.W. COMPANY 144
DAV-TECH 4,5
DEVELOPMENT SYSTEMS 175
DOMINO COMPUTER 33
D.S.C., ASC COMPUTER 140,141
DYNAMIC COMPUTER COMPANY 80,81
EINSTEIN TECHNOLOGY 145
ELECTRONIC MUSIC BOX 163
EURONE LA 173
EVERNET EDUCATION SERVICES 50
EZ COMPUTER 74
FRY'S ELECTRONICS 95-100,191
FUTURE COMPUTING SOLUTIONS 91
GATETRONIX CONTROL SYSTEMS 63
GOODMAN MUSIC 9
HACKER ELECTRONICS 8
HAMILTON MULTIMEDIA SYSTEMS 177
HUMAN COMPUTER 74
IMAGE MICROSYSTEMS 23
INPUT AUTOMATION 75
INSTRUCTION PLUS 14
JENLISH INTERNATIONAL 87
JUST-THE-FAX 40-42
K-NET 110,111
KAMFOZ COMPUTER SYSTEMS 135
KATRONIC COMPANY 36
KBBS 154
KINGSLEY 88,89
L.A. COMPUTER CENTER 71
LAKE FOREST COMPUTER CENTER 110,111
L.A. MICRO 34
LIGHTSHINE U.S.A., INC. 43
LINNEX COMPUTERS, INC. 10
LOGICACHE COMPUTERS, INC. 50
LOGITECH 83
MACK COMPUTER 109
MACRO TECHNOLOGIES 161
MAGICTEK COMPUTERS, INC. 126,127
MARS COMPUTER 171
MELCO INTERNATIONAL GROUP 125
MERLION COMPUTER 62
MICRO AMERICA 79
MICRO CENTURY 129
MICRO DISCOVER SYSTEMS 67
MICRO LEAGUE 155
MICRO SYS AUTOMATION, INC. 187
MICRO-CITY/GST, INC. 112,113
MIP SYSTEM, INC. 86
MPC COMPWORKS 126,127
MT. SIERRA COLLEGE 84,174
NET AMERICA 38
NET COMPUTER 146,147
NOKIA 2
ODYSSEY ONLINE 154
OFFICE SOLUTIONS 176
OKIDATA 29,31
P.C. SOLUTIONS, INC. 102
PACIFICO COMPUTER CENTER 68
PASADENA COMPUTER CENTER 72,73
PC CLUB 103
PC FACTORY 11
PC SERVICE 35
PC SYSTEMS DESIGN 114
PC WAREHOUSE 8
PRO COMPUTER SERVICE COMPANY 45
QUALITY COMPUTER 88,89
QUARTERDECK OFFICE SYSTEMS 192
R-TECH COMPUTER SALES & SVC 10
R.G. CANNING ATTRACTIONS 134
RAVEN COMPUTERS 176
ROYAL ELECTRONICS 104,105
SATURN TECHNOLOGY, INC. 106
SOUND ELECTRO FLIGHT 44
SUPERCOM MULTISYSTEMS 107
SYMPHONY COMPUTER 116
SYSCOM 117
THE ESSENCE GROUP 166-169
THETA COMPUTER 61
TSC COMPUTER 140,141
UNICOMP SYSTEMS 58
UNITEK COMPUTER STORES 15-17
UPTOWN COMPUTER, INC. 66
USA SYSTEMS 130
USM DISTRIBUTORS 132,133
WALNUT CREEK CDROM 162
WORLD NET COMPUTERS 128
YOKOHAMA TELECOM 161

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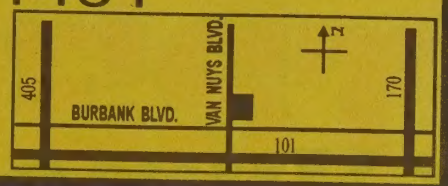

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Internet Humor

Or

When Will They Stand Up And Be Counted?

BY JOHN C. DVORAK

The time has come when the humor floating around free on the Internet is funnier (and better written) than anything I can do.

Urban folklore, of course, is the group effort of the collective unconscious. Even when one person does it, there is something mystical about the whole creation that puts it into the limelight—makes it part of universal folklore. (Hey, I took the Dundes Folklore classes at Berkeley—I'm convinced.) The amount of Urban Folklore floating around the Internet is unbelievable. There are 30K of Bobbitt jokes on the Internet.

Anyway I was combing through my Internet-based joke file and found one that was written about Microsoft, but could easily be rewritten for many Silicon Valley companies.

Thanks to the authors who released this to the world.

DVORAK'S LAST COLUMN

Copyright © 1994 by John C. Dvorak. All rights reserved. *John C. Dvorak graduated from the University of California. He is a contributing editor of* PC Magazine *and* MacUser, *and is considered by many to epitomize the contrarian view of things—a charge that he vehemently denies. Dvorak's motto is: If you have nothing nice to say, then don't say anything at all.*

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MICROSOFT VIEW: Work until the physical pain forces you into unconsciousness.

2. AVOID ISOLATION. Don't do everything alone! Develop or renew intimacies with friends and loved ones. Closeness not only brings new insights, but also is anathema to agitation and depression.

MICROSOFT VIEW: Shut your office door and lock it from the inside so no one will distract you. They're just trying to hurt your productivity.

3. CHANGE YOUR CIRCUMSTANCES. If your job, your relationships, a situation, or a person is dragging you under, try to alter your circumstances, or if necessary, quit.

MICROSOFT VIEW: If you feel something is dragging you down, suppress these thoughts. This is a weakness. Drink more coffee. (It's free.)

4. DIMINISH INTENSITY IN YOUR LIFE. Pinpoint those areas or aspects which summon up the most concentrated intensity and work toward alleviating that pressure.

MICROSOFT VIEW: Increase intensity. Maximum intensity = maximum productivity. If you find yourself relaxed and with your mind wandering, you are probably having a detrimental effect on the stock price.

5. STOP OVER-NURTURING. If you routinely take on other people's problems and responsibilities, learn to gracefully disengage. Try to get some nurturing for yourself.

MICROSOFT VIEW: Always attempt to do everything. You *are* responsible for it all. Perhaps you haven't thoroughly read your job description.

6. LEARN TO SAY "NO." You'll help diminish intensity by speaking up for yourself. This means refusing additional requests or demands on your time or emotions.

MICROSOFT VIEW: Never say no to anything. It shows weakness, and lowers the stock price. Never put off until tomorrow what you can do at midnight.

7. BEGIN TO BACK OFF AND DETACH. Learn to delegate, not only at work, but also at home and with friends. In this case, detachment means rescuing yourself for yourself.

MICROSOFT VIEW: Delegating is a sign of weakness. Let someone else do it (See #5).

8. REASSESS YOUR VALUES. Try to sort out the meaningful values from the temporary and fleeting, the essential from the nonessential. You'll conserve energy and time, and begin to feel more centered.

MICROSOFT VIEW: Stop thinking about your own problems. This is selfish. If your values change, we will make an announcement at the company meeting. Until then, if someone calls you and questions your priorities, tell them that you are unable to comment on this and give them the number for Microsoft Marketing. It will be taken care of.

9. LEARN TO PACE YOURSELF. Try to take life in moderation. You only have so much energy available. Ascertain what is wanted and needed in your life, then begin to balance work with love, pleasure, and relaxation.

MICROSOFT VIEW: A balanced life is a myth perpetuated by the Borland Marketing Team. Don't be a fool: the only thing that matters is work and productivity.

10. TAKE CARE OF YOUR BODY. Don't skip meals, abuse yourself with rigid diets, disregard your need for sleep, or break the doctor appointments. Take care of yourself nutritionally.

MICROSOFT VIEW: Your body serves your mind, your mind serves the company. Push the mind and the body will follow. Drink Mountain Dew. (It's free.)

11. DIMINISH WORRY AND ANXIETY. Try to keep superstitious worrying to a minimum—it changes nothing. You'll have a better grip on your situation if you spend less time worrying and more time taking care of your real needs.

MICROSOFT VIEW: If you're not worrying about work, you must not be very committed to it. We'll find someone who is.

12. KEEP YOUR SENSE OF HUMOR. Begin to bring joy and happy moments into your life. Very few people suffer burnout when they're having fun.

MICROSOFT VIEW: So, you think your work is funny? We'll discuss this with your manager on Friday. At 7:00 pm. ■

—Author Unknown

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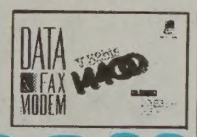

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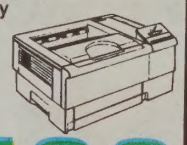

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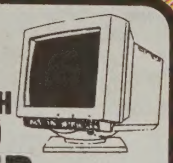

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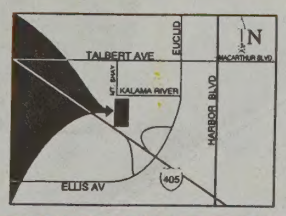

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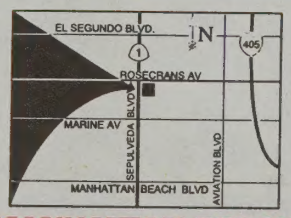

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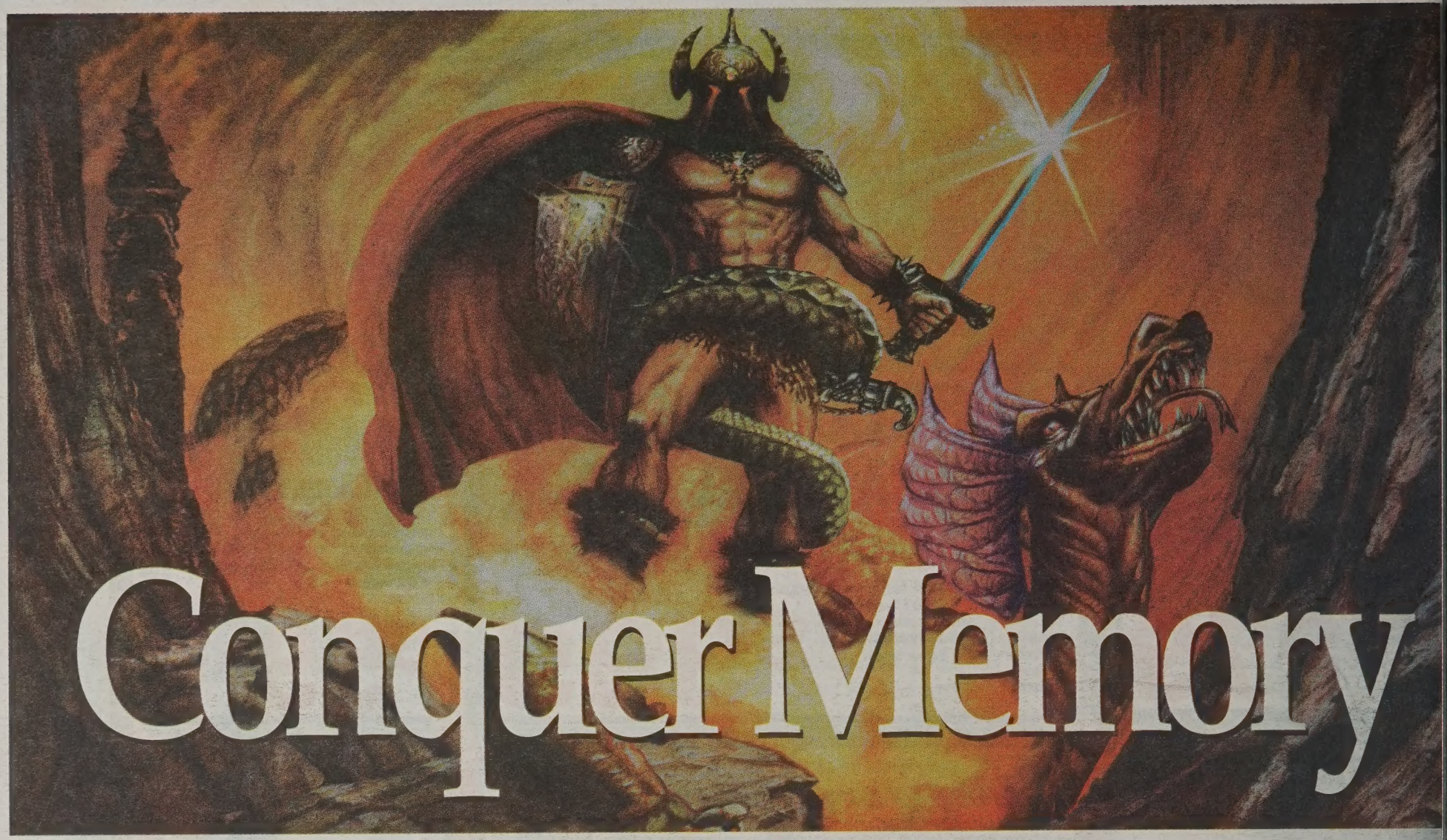

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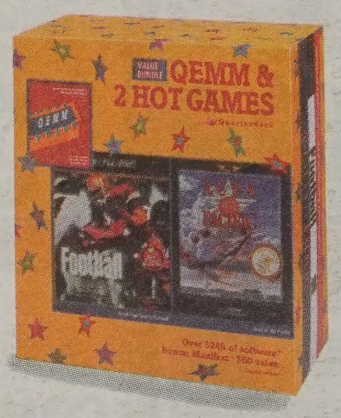

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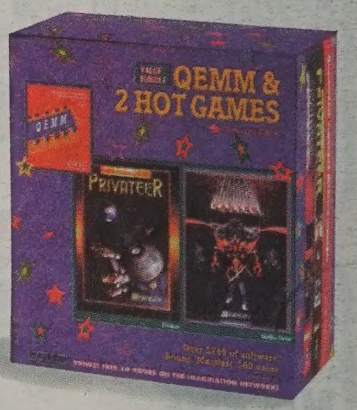

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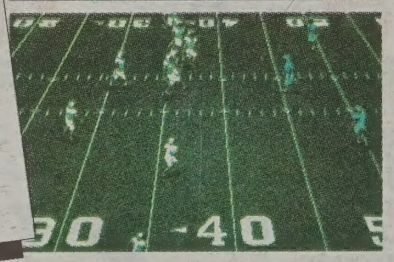

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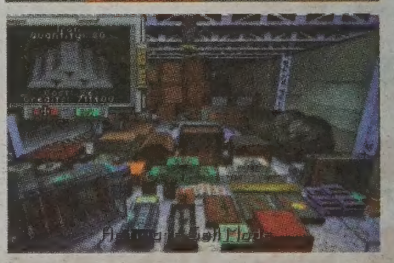

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